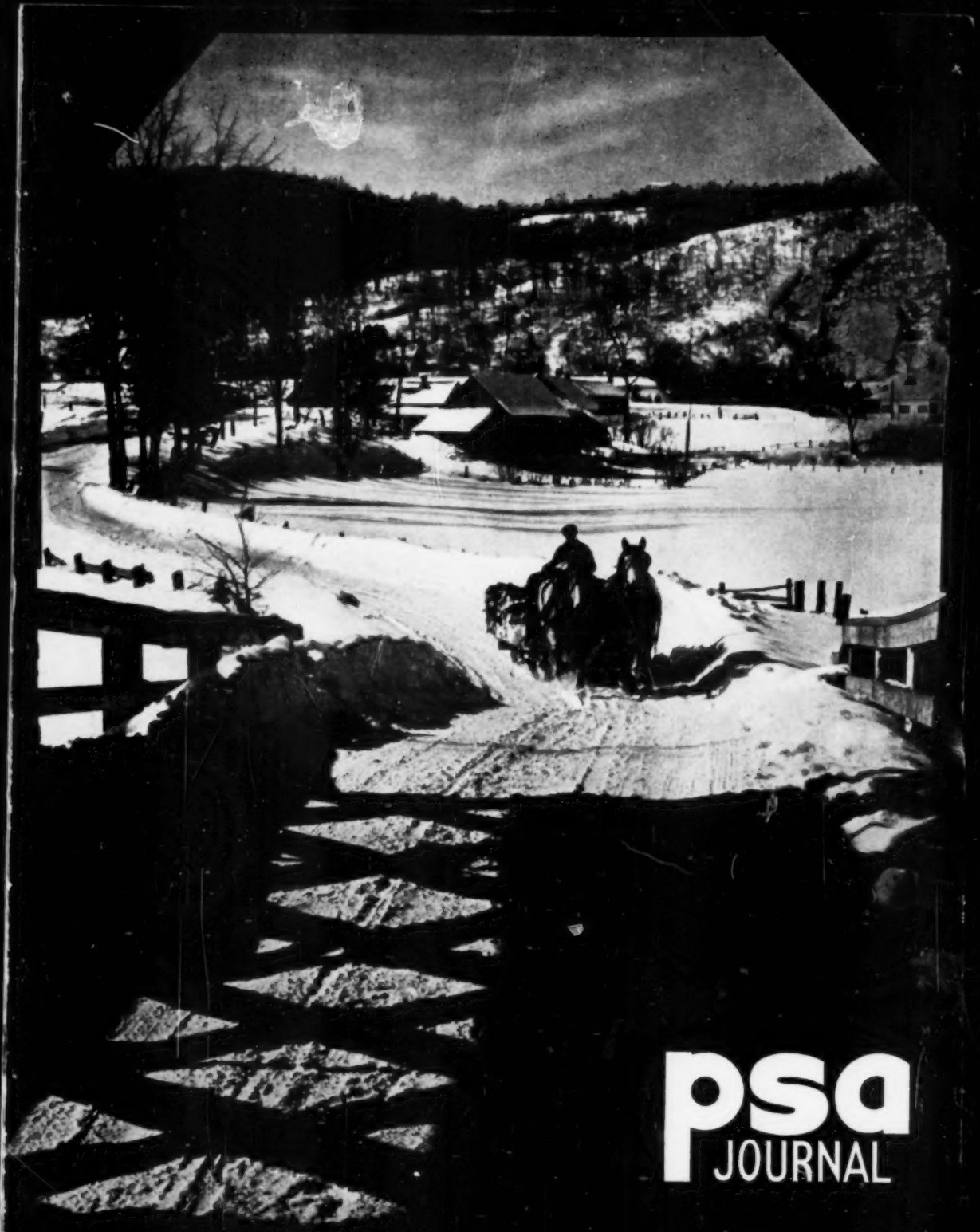

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VOLUME 15 NUMBER 1

JANUARY 1949

Photograph America...

Photograph by Ray Atkeson

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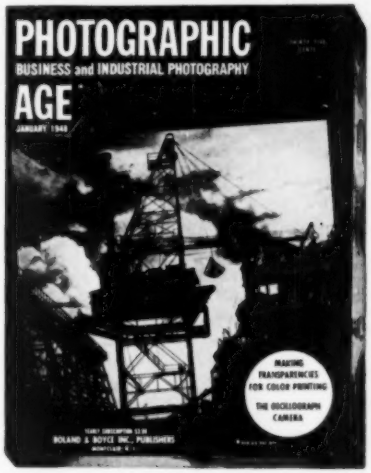

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Editorially Speaking . . .

AMONG THE nice features of having a brand new year every 12 months is the possibility of making resolutions. Even if broken, resolutions are noble intentions and contribute to morale.

BY THE end of 1949, for instance, PSA could have twice as many members as now. PSA JOURNAL could be twice as big and many times as good. PSA Divisions and committees and activities could be doing more work more effectively and successfully. The Society could have a new home.

RESOLUTIONS OR dreams, call them what one will, frequently are within the realm of possibility. To get them out of the dream stage and on the safe ground of reality could be an easy task *if* every PSA member would devote a little time and energy to the job.

OF COURSE, any member can look at the situation another way. He can plan to let George do it, comfortable in the thought that to refrain from dragging his feet is really to help. But is rationality enough?

IT WOULD be inspiring to think of a PSA growing by thousands of members, become a cause instead of only an organization, doing bigger things *for* and *in* photography. It would be inspiring to think of every member doing his share *for* and *in* PSA—taking advantage of all the opportunities, participating in all the projects, becoming loyally, vociferously, enthusiastically active.

THERE'S SOMETHING ennobling about losing oneself in a cause. There's a thrill in seeing a vast structure rise because one has lifted. True, one loses one's comfort. That is no great sacrifice for there is the compensating gain in achievement. In these thoughts, perhaps, there's the gist of a 1949 resolution! —V.H.S.

PSA CONVENTION

St. Louis, Mo., October 19, 20, 21, 22, 1949

*Photoprogress in 1948**

By Glenn E. Matthews, FPSA
Technical Editor, Kodak Research Laboratories

Many additions to the small camera market . . . Improved equipment items . . . Continued strides in color photography . . . New aids to scientific investigation . . . Devices for rapid facsimile transmission . . . Progress in aerial photography . . . Growth in popularity of amateur movies, television

The usefulness of photography in the well-known fields of industry, education and science continued to expand during the year as new materials and equipment were made available. The industry was said to be about 3½ times its 1939 size in terms of the wholesale value of goods produced. It is not generally realized today that only about 33 per cent of photographic materials are for amateur use and that the other two-thirds are for professional and technical use. Over-all production of photographic materials and equipment for the year was ahead of 1947 and production of some items was several times that of 1940, the last pre-war year. Supplies of raw materials appeared to be more plentiful and new tooling permitted the introduction of more new apparatus and accessories than had been possible for many years. A small percentage of equipment sold represented imports from factories in England, France, Western Germany, and Japan.

Some measure of the public interest in photography as a hobby was indicated by the attendance of 30,000 at the Los Angeles Photo Fair on June 25 to 29. Enthusiastic support was also given the meeting of the professional Photographers Association of America in August at Chicago, the Trade Show of the Master Photo Dealers and Finishers Association at Cleveland in October, and the Photographic Society of America convention at Cincinnati in November.

Materials and Equipment

Perhaps the most important announcement in the field of film manufacture was the paper by C. R. Fordyce describing an improved safety motion picture film support. The product was said to be a highly acetylated cellulose acetate having improved physical properties and better aging characteristics than commercial safety film in previous use. It was predicted that the new safety film would probably replace nitrate film support within the next few years.

An interesting advertisement on "How Photographic Film Is Made" was published in the *Saturday Evening Post* for January 17. It reproduced in color a cutaway drawing of the various stages of film manufacture as

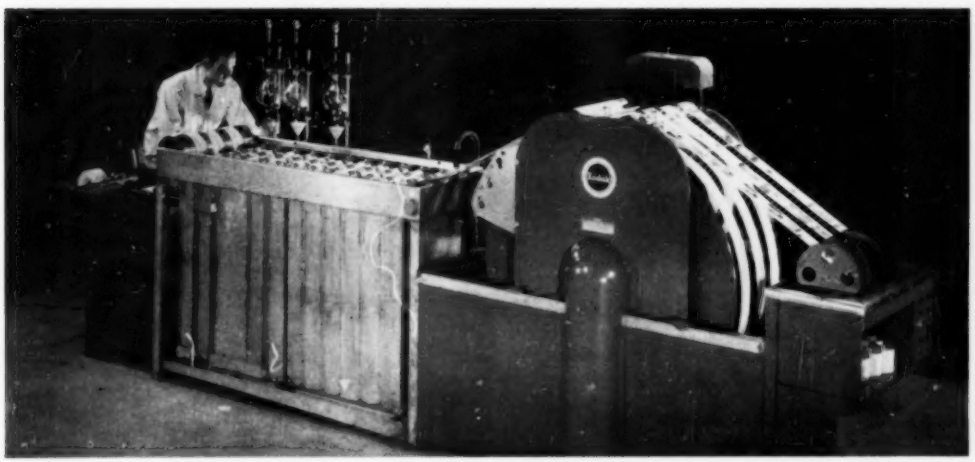


Fig. 1. Continuous Print Processing Machine. Capacity—2400 prints per hour—(800 per strip).

* *Reprinted by permission from the "Americana Annual" for 1949 by the Americana Corporation, Chicago, Ill.*

symbolically conceived in one large building. The ad was prepared by the Armstrong Cork Company with the cooperation of the National Association of Photographic Manufacturers.

A few of the new sensitized products announced during the year were the following: Ansco Strip Paper, No. 55 in 1,000 foot rolls, Improved Ansco Color Printon, Cykora Paper, Kodak Separation Negative Plates, Type I, Kodak Highlight Masking Film, Kodak Super-X and Super-XX Blue Base Reversal Films, Remington-Rand RRembrandt Chlorobromide Projection and Contact Paper, Velox Unicontrast Paper, Rapid F in sheets and in 1,000 foot rolls for strip printing, Weimet Reversal Safety Color Film. Photographic plates for the 48-inch Schmidt-type telescope on Mt. Palomar were supplied on very thin (0.040-inch) glass which could be bent into a section of a sphere.

New Cameras Introduced

According to an article in *Fortune* for March, at least 125 still-camera models built by some 50 different companies, could be purchased on the American market. Additions to the small camera market included three models by Ansco, the Flash Clipper, standard Speedex and Titan; Busch 4 by 5 Pressman; four new Kodak Tourist Cameras; the Kodak Duaflex; the Perfex, Series 100 Camera; Kalart Camera; and Bell & Howell Foton Camera.

Safety locks on the Kalart Camera were said to make it impossible to get blank exposures or to fire the flash prematurely. The Foton makes double frame pictures on 35-mm film, the film being advanced by a spring-wound motor enclosed in the base of the camera. It was claimed that 12 exposures could be made within a second. A new type focal plane shutter was used consisting of four metal leaves, two located behind the lens and two at the film plane. The Cooke lens is marked in T stops rather than F settings, the first lens to be so calibrated. To calibrate a lens opening under the T system, light of known spectral quality (noon sunlight) is passed through the lens and measured at the image plane. This system was recommended by a subcommittee of the American Standards Association as a better system for calibrating lenses than the F system.

A commercial model of the Land One-Step Photographic Process Camera was demonstrated in November at the PSA meeting in Cincinnati. With the Land process which was announced in 1947, a finished print can be made in the camera in about one minute after the exposure.

The Beattie Portronic Camera holds 100 feet of 70-mm film and was especially recommended for studio portraiture and industrial identification. Pressing the button makes an exposure with electronic synchro-flash, prints an identification number, and advances the film. Imported cameras included the British Coronet-Cameo, the German Linhof Technika, Model III, and the Retina I and II made at the Kodak factory at Stuttgart.

Very few new 16-mm cameras and projectors were introduced but a number of accessories were placed on the market. The Cine Kodak Special Model II had several improvements including a lens turret. The Revere Sound Projector was announced in April and the Revere 16-mm Projector, Model 48, in October. Of considerable interest were the seven new Cine Ektar Lenses which varied in focal length from 15-mm (f/2.5) to 152-mm (f/4). The fastest lens of this group, the f/1.4 Ektar, was described by C. D. Reed in an article published in PSA JOURNAL, *14*:425, August, 1948. A fast Wollensak lens was announced called the Cine Raptar of f/1.5 aperture. Another new accessory was the Craig 8-mm Projecto-Editor with viewing screen.

Continuous Processing Equipment

A growing trend was noted in recent years for more continuous processing equipment in the motion picture and photofinishing laboratories. In line with this trend, the Eastman Kodak Company announced their Continuous Paper Processor machine designed to turn out 2400 average size enlarged prints per hour (Fig. 1). New roll paper printing heads for use on two models of semi-automatic printers were also announced. Another continuous print processor, known as the Fotopak machine, was stated to be adaptable for use with modified commercial printers and dryers.

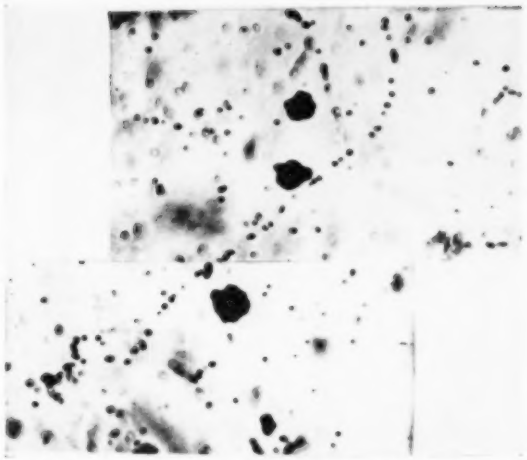
Items of miscellaneous equipment included the following: Argus PA-200 Projector for 35-mm slides; Kodaslide Table Viewer holding 75 slides which can be projected rapidly on a 7½ by 7½ inch self-contained screen in full room light; Federal Store-Away Senior Enlarger; Kodak Studio Speedlamp; and Kodak Color Densitometer.

Chemicals in packages, bottles and packets were generally preferred by the amateur and the professional photographer although a limited number of workers continued to make up their own solutions. Various chemicals, developers, stop baths, fixing baths, etc., were supplied by one firm in small heat-sealed metal foil units for amateur workers.

A one-bath reversal process was described by H. A. Miller which permitted positive transparencies to be made directly on film exposed in the camera or printed duplicates of negatives or positives. The image is developed in a developer containing hypo and then given a light-fogging treatment (PSA JOURNAL, *14*:103, February 1948).

Color Photography

The popularity of color films continued unabated in both the amateur and professional fields. Even though manufacturers increased the production of color materials beyond that ever achieved before, the demand for such products still exceeded the available supply. According to one analyst, more than 25 per cent of the 35-mm still photography in America and about 85 per cent of the amateur motion picture film market was in color. A much lower percentage of the roll film market used color materials compared with black and white but the percentage was increasing slightly each year. The num-



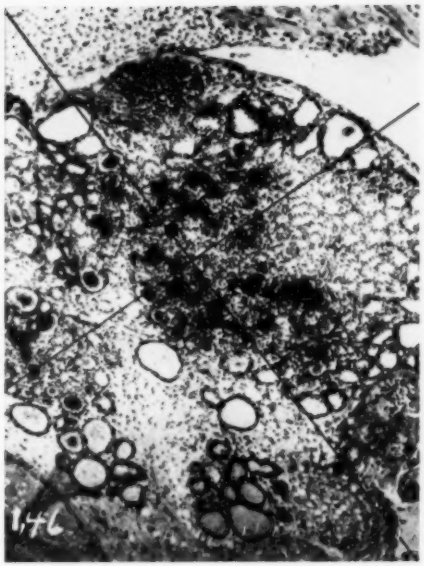


FIG. 2. (Above) Track of an Electron in a Photographic Emulsion (Kodak NTB Plate). FIG. 3. (Right) Autoradiograph of Rat Thyroid Tissue Showing Presence of Radioactive Iodine (Dark Spots in Center). *Credit: Dr. G. A. Boyd, School of Medicine and Dentistry, University of Rochester, N. Y.*

ber of concerns who would accept the job of processing exposed color film and making prints was estimated to be in excess of 50 and less than 100 compared with 3000 to 4000 photofinishers doing ordinary developing and printing.

No new color materials were known to have been placed on the market but a steady improvement was noted in the quality of several of the older materials, such as, Ansco Color Films and Printon, Ektachrome and Kodachrome films. Both Kodachrome and Kodacolor prints were being made in several enlarged sizes up to 11 by 14 inches as well as the more common smaller sizes. Improved techniques were being used by professional photographers in making color pictures such as multiple exposures, controlled distortion color lighting and better retouching of transparencies and prints.

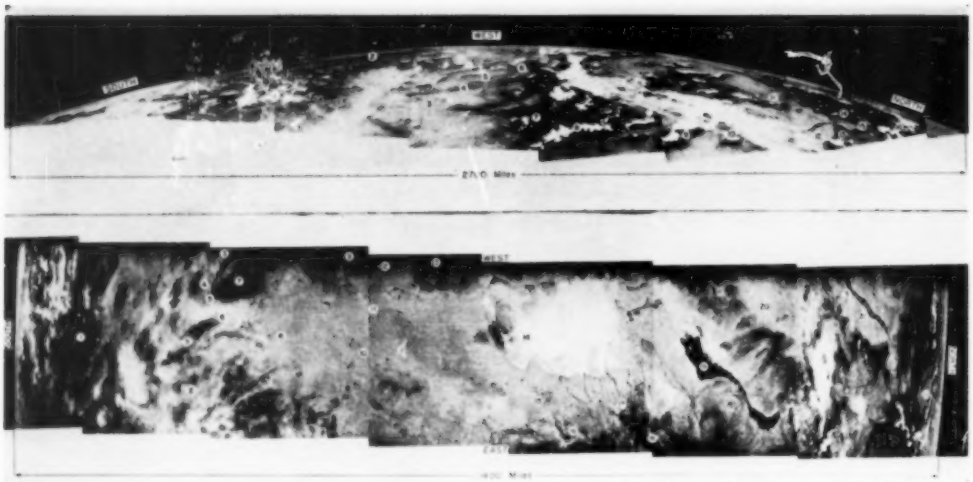
Non-toxic color developers were featured by both Kodak and Ansco. In England a reducing agent known as "Genochrome" for use in color developers was made by May and Baker, Ltd. Details of the processing chemicals, formulas and techniques used for the Vivex Process by Color Photographs Limited, between the years 1928 and 1939 when the factory closed down, were published by Coppin and Spencer (*Photographic Journal, 88B*:78, July-August 1948). Since the basic principles used were believed to be an improvement over the Carbro process, it was thought that publication would be of help to photographers using that process.

Color Quality Improves

The quality of color reproductions in magazines and books appeared to be somewhat better than in previous years. More color work was being done, paper quality was better, and printing shops had begun to learn the new techniques of masking color transparencies. A few of the more interesting color photographs reproduced in *Life* magazine were the following: a full page spot news picture of a big fire in Montreal; the first published color photograph of the planet Mars; the series of color photomicrographs of sludge in blood cells made by F. W. Goro; a full page action shot of a basketball game. Thirteen color pictures of the national political conventions in Philadelphia were reproduced by color rotogravure on the editorial page of the New York "News" for September 12. The March issue of *National Geographic* magazine contained a fine group of color reproductions of pictures of circus action exposed with electronic flash tube equipment.

Two years ago the Technicolor Motion Picture Corporation started an expansion program from 160 million feet per year print manufacturing volume to a goal of 320 million feet a year by the end of 1948. By midyear they reported that they were enjoying more than 50 per cent of this increased capacity. Increased capacity was also predicted for Cinecolor (a two-color process) who expected to complete 45 feature pictures during the year. A description of the Trucolor process of Republic Pictures was published by R. Fleet (*Amer. Cinemat., 29*:79, March 1948). Color couplers are used to form a red dye image on one side and a blue dye image on the other side of the film.

A few new color motion picture processes were announced. Polacolor was said to produce three separate color images in a single layer from three color separation negatives. Standard processing apparatus and projection were used. Gevacolor was stated to be the Gevaert version of the German Agfacolor process. The emulsion layers of the integral tripack contain color couplers,



Credit: Official U. S. Navy—Johns Hopkins (APL) Photograph

Fig. 4. Rocket-Borne Sequence Cameras Film Large Segments of Surface of the Earth. *Upper Composite* made from V-2 Rocket at 60-miles height shows recognizable land marks across an arc of 2700 miles of the earth's circumference. (1) Mexico; (2) Gulf of California; (6) San Carlos Reservoir; (12) Albuquerque, N. M.; (15) Rio Grande River. *Lower Composite* made from Aerobee Rocket at 70 miles shows a strip of terrain about 1400 miles long. Landmarks shown include (1) Mexico; (2) Texas; (8) S. P. Railroad; (12) White Sands, N. M.; (15) Alamogorda Army Air Field. Photos made with converted K-25 cameras fitted with f/4.5 163-mm lens on Super-XX Film. Shutter speed—1/500 sec. at f/8.

Processing details as reported appear to follow the orthodox plan used for reversal color materials. An additive system of color photography, called Rouxcolor, employs a lens system that forms four images in the area usually filled by one image on a standard negative. Four color filters, deep red, yellow, green and violet, one over each lens component, are used in both the camera and the projector. The four images are superimposed again on projection.

Scientific Investigation

New frontiers of knowledge were explored with the aid of photography during the year. Encouraging results were obtained by scientists who used special emulsions of high silver halide content and low background fog to record the tracks of charged particles which move at high velocity through the emulsion. These tracks are found by the slow, tedious method of examining hundreds of small areas of the plate under a microscope. Cosmic ray and proton tracks were recorded as early as 1935, but it is only within recent years with the advent of large cyclotrons, more radioactive substances, and special photoplates that extensive research has been possible. In 1947 Powell and coworkers in England recorded for the first time two types of mesons, one from cosmic rays and the other from the decay of the first type. In February of this year Gardner and Lattes created mesons artificially by bombarding various materials with helium nuclei in the giant cyclotron at the Radiation Laboratory of the University of California and found wavy tracks of mesons recorded on the special photoplate. Since the life span of meson may be as short as a millionth of a second, the great usefulness of the photographic emulsion as a recording material can be appreciated.

Electron tracks in new types of photographic plates were first definitely identified this year at the Kodak Research Laboratories in Harrow, England, and Rochester, New York, where tracks as great as 60 grains long were counted on microphotographs (Fig. 2). From the length and curvature of the track and the grain spacing, information is obtained of the electron's speed and other characteristics. Tracks of atomic fission of uranium and of thorium have also been recorded. Studies of particle tracks as recorded by the photographic emulsion may prove very important in the future development of nuclear research.

Another frontier of knowledge was being investigated with the aid of autoradiography. For these studies special emulsions approximately 1/5000 of an inch thick are used. With these emulsions it is possible to locate accurately the presence of radioactive substances in biological specimens and plants. Thus, if radioactive iodine and phosphorous are injected into an animal, the iodine is selectively absorbed by the thyroid and the phosphorous by the bone. When a microsection of such tissue is placed on one of these special plates, a heavy exposure is produced in areas adjacent to the radioactive portions of the specimen. Photomicrographs of the stained tissue then reveal the exact location of the radioactive substance (Fig. 3). This technique was being used in the study of cancer and other diseases.

Palomar Telescope

The great 200-inch reflecting telescope on Palomar Mountain in California was dedicated on May 3 and it was expected to be ready for use for photography late in the year or early in 1949. The photographic plates which will be used in the telescope have emulsions that are four times as fast as those in use for astronomical work in 1928 when the big telescope project was started. Frequently a spectroscope will be attached to the telescope and specially sensitized emulsions will be used to measure various characteristics of the stars. Rarely will anyone look through the telescope as the camera will be in use every minute that visibility permits photography. A color motion picture, "The Story of Palomar," was completed during the year and will be released through the California Institute of Technology.

High speed or ultra rapid photography has long been used to study events that happen very quickly, too fast to be seen by the human eye. To the list of photo-devices for micro-time research was added an all-electric camera that has the fastest shutter yet devised. With this instrument, known as the Zarem Camera after Dr. A. M. Zarem who designed it for the Navy, it was said that exposures can be made in 100 millionth of a second. The shutter is basically an electro-optical Kerr cell (glass tube filled with nitrobenzene with two immersed electrodes) mounted between crossed polarizing filters. Normally light passed by the first filter is blocked by the second; however, when about 5,000 volts are applied across the electrodes of the cell, the fluid rotates the light so that it passes through the second polarizer and an exposure is made. Although the principle of the Kerr cell is well-known, its practical usefulness for ultra high speed photography is still under study.

Further exploratory studies were made during the year with cameras installed in rockets and operated by automatic control. As the rocket descended an explosive charge would blow off the head and release the cameras and other equipment to fall by parachute to the ground. In one set of composite photographs published in October, more of the earth's surface was revealed than had ever been seen before at one time. A 2,700-mile arc of horizon was photographed with a camera installed in a V-2 type rocket when it reached a height of 60 miles (Fig. 4). The mosaic of seven exposures made at 1½ second intervals showed an expanse of country from Mazatlan, Mexico to Hyannis, Nebraska. Another sequence, taken from a Navy Aerobee rocket at a height of 70 miles, showed an hour-glass shaped panorama, 1400 miles long. Both rockets were fired from launching sites near White Sands, New Mexico (*Life*, 25:40, October 25, 1948).

New Era in Communication

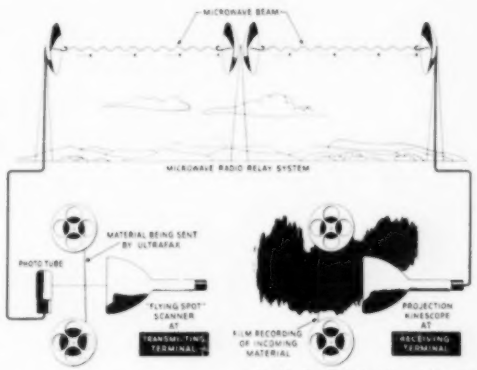
In 1947 a new era in communication was predicted in connection with devices for rapid facsimile transmission of text matter and photographs. Considerable progress was made in this field during the year. One system known as Ultrafax was demonstrated effectively on October 21 at the Library of Congress in Washington when the entire 1037 page novel, "Gone With the Wind," was transmitted a distance of three miles in about two minutes.

The system works as follows: (1) each page is photographed on special heat resistant film and the film is run through a rapid-developing machine; (2) the finished film is sent through the Ultrafax television system at 30 messages a second, giving a transmission speed of 1800 pages a minute; (3) at the receiver motion picture film again records the transmitted images and a rapid processing machine develops them for immediate projection or multiple copy prints (Fig. 5). This system was developed by the Radio Corporation of America with the cooperation of the Eastman Kodak Company and the National Broadcasting Company. It promises to be of great usefulness for transmission of messages, printed matter, charts, documents and other material at a rate never achieved before.

Although man has explored the earth for several thousand years, three quarters of this planet lie beneath the sea and remain almost wholly unexplored. It is known that abundant life exists there as well as great geological areas of subterranean mountains and plains. Much of the area below the sea is eternally dark since sunlight cannot penetrate the sea more than a few hundred feet. Studies have been made of the ocean for at least 14 years by Dr. Maurice Ewing and photography has been used for much of this work.

During the summer of 1948 successful photographs were made at depths never before seen; the greatest reached was 3½ miles where sponge-like formations were recorded clearly on the floor of the mid-Atlantic. The camera and a flash apparatus in watertight containers were attached to a pole and lowered to the bottom where a trigger released the flash and made the exposure. Many pictures were made and samples of the ocean bottom obtained during a 20,000-mile cruise of the ketch, "Atlantis," which for 14 years has roamed the seas of the world.

Survey mapping from the air continued to be one



Credit: Radio Corporation of America.

FIG. 5. Diagram of Ultrafax System for Rapid Transmission of Messages—A Million Words a Minute.

of the most important uses of aerial photography. Besides further progress in this field noted by the publication, *Photogrammetric Engineering*, the U. S. Navy completed a survey of 30,000 square miles of Alaskan territory in cooperation with the Department of the Interior and other government agencies. Tri-metrogon photo equipment was used for this project. An automatic focus rectifier for mosaic map making was built by Bausch & Lomb Optical Company for the Army Corps of Engineers. The instrument can enlarge, reduce and correct for tilt when printing aerial negatives. It was expected to assist in mapping for national highways and to be of use in soil erosion studies and flood control work.

With the greatly increased speed of airplanes within the last 10 years and the need for reconnaissance flights at low altitudes, it has become increasingly difficult to obtain photographs without image motion. An experiment in supersonic aerial photography was reported by the Photographic Laboratory, Engineering Division, Air Material Command, of the U. S. Air Force. A method of testing an S-7 Aerial Strip Camera at a simulated speed of 1,000 miles per hour was devised. Essentially the flight test was based on using the combined speeds of two P-80 jet aircraft each flying in opposite directions at 500 miles per hour with a separation of 500 feet. Two strip cameras with lenses of 6-inch and 24-inch focal length were used and the movement of the film past the slit was synchronized to record a plane speed of 1,000 miles per hour. Excellent pictures were obtained with dimensional accuracy within 2 per cent in the direction of the flight (Fig. 6A and 6B).

Extended Flight Tests

On September 1 a nonstop flight of 2700 miles was made by the U. S. Air Force from Santa Barbara, California, to New York City to test aerial cameras and photographic techniques under extended flight conditions. Using a tri-metrogon camera installation with three K-17 type cameras fitted with 6-inch lenses, 390 exposures were made on one film at 50 second intervals with intervalometer control. Each group of three pictures covered an area about 490 miles wide. The strips of film were joined after the flight and show clearly the location of cities and landmarks on the flight line. This continuous photographic strip was stated to be the first one to have been made by a nonstop flight across the United States. The altitude of the plane was about 40,000 feet throughout the flight.

A P-80 jet drone plane of the U. S. Air Force for use in tests considered too hazardous for a pilot to undertake was equipped with four motion picture cameras which could be operated by remote control from the ground or a mother plane. One camera recorded the instrument panel, two mounted in the fuselage photographed either wing tip, and the fourth camera was mounted beside a television camera in the nose. A fifth camera photographed the television receiver screen in the ground control truck.

Takeoff and landing of all Lockheed experimental airplanes was recorded with a motion picture camera which photographed these maneuvers through a special wire grid, 9 feet high and 64 feet long. Vertical wires marked off 100-foot runway sections and horizontal wires designated altitude in 25- and 50-foot sections. The grid camera film record was said to permit accurate calibration of the airplane's speed and other useful data.

Motion Pictures and Television

The year 1948 marked the 25th anniversary of the 16-mm reversal process. Some of the published statistics are timely as a measure of the growth of the interest in amateur motion pictures. It was stated that there were 1,100,000 families in the United States who own amateur movie cameras; about three-quarters of this number were using 8-mm cameras and the rest 16-mm cameras. Approximately 950,000 families owned projectors.

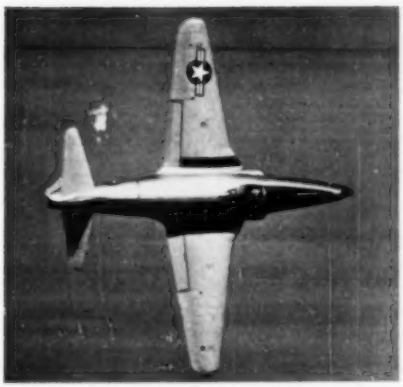
The growth of visual education in the United States since the end of World War II has been very rapid. Less than 500 sound projectors were said to be in use in all the nation's schools before the war, whereas in 1948 many thousands of projectors were in use. Chicago University had about 8,000 prints of nearly 700 films in its library. The U. S. Office of Education expected that more than 8,000 different industrial and educational films would be available by 1950. In line with the great public interest in building and housing, it was reported that 68 new films on this subject were in use.

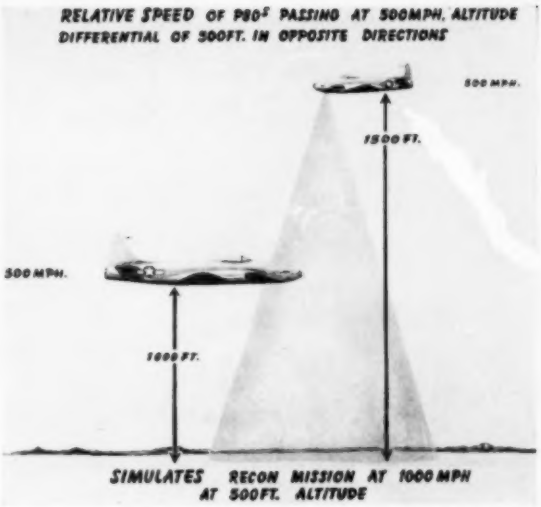
Considerable interest was noted among owners of 8-mm film equipment in the use of magnetic tape sound recording for their motion pictures. One movie enthusiast claimed to have obtained good results with magnetic powder flowed along the sprocket hole side of the picture film.

Extended use of 16-mm pictures was noted in the instructional, industrial, medical, and scientific fields. Better cameras, films, and techniques resulted in a noteworthy improvement in the quality of 16-mm pictures.

In the professional 35-mm field, the new recording equipment installed in the studios during 1947 was being used effectively. High interest was also noted in magnetic recording methods for 35-mm film. The subject that appeared to be uppermost in the minds of the technicians and the executives of the motion picture industry was television.

Conservative reports indicated that nearly a million television receivers would be in use by the end of the year. It was realized that a large percentage of video time for many years to come will require motion pictures instead of live talent shows. That the motion picture industry intended to supply a fair percentage of this film product was indicated by the signing of contracts by several of the well-known film producers, such as, Jerry Fairbanks, to make several hundred feature television films yearly. The type of the prints for this purpose was said to be quite different than that used for theater projection. Several subjects of the "Public Prosecutor" series, the first to be made especially for television, were completed during the year.





Credit: Photographic Laboratory, Engineering Division, ATC, U. S. Air Force.

FIG. 6A. (Above) P-80 Jet Airplane Photographed at Simulated Supersonic Speed of 1,000 miles per hour. Distortion of Air Force emblem is less than 2 per cent. FIG. 6B. (Right) Diagram Showing Method of Making Photograph Shown in Figure 6A. An S-7 Aerial Strip Camera was used with the film movement past the slit adjusted to record a plane speed at 500 feet of 1000 m.p.h.

Large-screen television using a film recording system was given several practical tests at the Paramount Theater in New York City. On April 14 a boxing bout at the Navy Y.M.C.A. in Brooklyn was televised to the theater where the image on a 15-inch cathode ray tube was photographed on 35-mm film and processed ready for projection within 66 seconds. Later in the year with the aid of better techniques and equipment the total elapsed time was reduced to 22 seconds (Fig. 7). An electronic or a mechanical shutter transforms the 30 pictures per second of the televised image to 24 pictures per second used for sound picture projection. Direct instantaneous projection of televised images was accomplished on January 1 on an 18-foot screen in the Shrine Auditorium in Los Angeles before an audience of 5,000 persons. It was predicted that both of these methods of using television in the motion picture theater will be used but the film method had more advantages to encourage its use.

Industrial and Technical Uses

A new method of fitting men's clothes making use of a special camera and nine mirrors was claimed by its inventors to achieve scientific exactness. For this photographic tailoring scheme called Photo-Metric, the customer was photographed while wearing a tape measure harness. The resulting pictures were then projected on a big screen in half scale whereupon gauges on the screen plus a geometric calculator furnished the tailor with the necessary accurate measurements.

The first radar navigation chart of over 300 miles of the Ohio River was completed from a mosaic of photographs of the radar scope images during the early spring of this year. The Mirar camera made by the Fairchild Camera and Instrument Corporation was said to be suitable for use with all makes of ship borne radar equipment. It has a capacity of 100-feet of 35-mm film.

Many of the events at the Olympic Games at Wembley, England, were photographed with a special camera which used moving film and a slit. It made pictures exactly along the finish line as each competitor crossed the line. The speed of movement of the film had to be set for each race based on the estimated speed of the contestants at the finish line. Within 60 to 90 seconds after the finish of the race, prints were delivered to the judges.

Credit: Television Division, Paramount Pictures, Inc.

FIG. 7. Rapid 35-mm Film Processing Machine for Theater Television. Camera to right of figure (lower left) photographs image on television monitor screen. Film moves through tube and processing machine, dryer and into projector in 66 seconds.

Bibliography

Fun with Your Camera. J. Deschin. McGraw-Hill, N. Y.

Making Your Pictures Interesting. E. Theisen. Ziff-Davis Publishing Co., Chicago.

Camera and Lens and *The Negative*. A. Adams. Basic Photo Series No. 1 and No. 2. Morgan & Lester, N. Y.

Camera Art as a Means of Self Expression. M. Thorek. Lippincott Co., Philadelphia.

La Technique Photographique. L. P. Clerc. P. Montel, Paris. 4th ed.

Magic Shadows. The Story of the Origin of Motion Pictures. M. Quigley, Jr. Georgetown University Press.

The Miracles of the Movies. L. Wood. Burke Publishing Co., London.

Color Photography for the Amateur. K. Henny. McGraw-Hill, N. Y. Revised ed.

Color Photography in Practice. D. A. Spencer. Pitman & Sons, London. 3rd ed.

An Introduction to Color. R. M. Evans. Wiley & Sons, N. Y.

How To Take Industrial Photographs. M. H. Zielke and F. G. Beezley. McGraw-Hill, N. Y.

Aerial Photographs in Forestry. S. H. Spurr. Ronald Press, N. Y.

Fundamentals of Photographic Theory. T. H. James and G. C. Higgins. Wiley & Sons, N. Y.

Australian Photography. Edited by O. L. Ziegler. Sydney, Australia.

1948 Film World 16 mm. Film and Industry Directory. C. J. Ver Halen, Jr., Hollywood, Cal.

The Twin-Lens Camera Companion. H. S. Newcombe. Focal Press, London.

Making Duplicates from Color Transparencies[†]

By E. H. Loessel *

The growing interest in color transparencies brought with it the demand for satisfactory duplicates. Why duplicates? Lack of time or film may have prevented the shooting of a sufficient number of originals. Or, the size of a transparency may be unsuitable for projection, or may not fit the size requirements in a contest. Or, a transparency may be too rare and valuable to expose it to the wear and tear of a lecture tour. Sometimes an original of extremely long density range can not be satisfactorily reproduced by any of the available color printing methods, due to the familiar scale limitations of reflection prints, and only a transparent print, a duplicate, can do justice to the original. In fact, here we touch on one of the main reasons for the enormous expansion in the field of color transparencies: the growing realization by pictorialists, scientific workers and commercial advertisers of the possibilities, the advantages, the greater impact which color images viewed by transmitted light have over reflection prints.

Probably the most extensive and intricate application of color duplicating methods is in the professional motion picture field in connection with monopack camera film.[1-2] Special film materials and processes are used to produce from Ansco Color originals the master dupes from which the hundreds of release prints are made. But it is in the field of still color photography where duplicates, unaided by the tricks of motion picture sorcery, have to stand the most severe, prolonged scrutiny by critical eyes.

Making a duplicate from a positive color transparency is closely related to making a reflection color print and involves the same considerations and problems.[3] In both cases we attempt to reproduce a color image as faithfully as possible with regard to density and gradation. In both cases we may attack the problem by the cumbersome way of color separation negatives. And in both cases we would prefer to arrive at an acceptable result by the much simpler method of printing directly on a monopack color material. It is a method of this latter type that is to be described, a practical proven method whose limitations and compromises are fully recognized, but which, nevertheless, is attractive due to the comparative ease with which it permits one to attain enjoyable duplicates.

Ansco Color Positive Film is the duplicating material, the ordinary camera film which is commercially available in sheet, Leica and 120 and 620 roll film sizes. Unfortunately, it is generally not possible to obtain a satisfactory duplicate simply by exposing the duplicating material through the original transparency and developing it normally. Positive color transparencies are normally developed to a high contrast, a gamma of about 1.6 to 1.8, in order to achieve high color saturation and brilliance. For that very reason the duplicate should be treated the same way. This, however, would mean further raising of the already high contrast of the original transparency, since the duplicate contrast depends directly on the combined gradational characteristics of original and duplicating material. The result would be a duplicate of excessive contrast.

Since this difficulty can not be overcome simply by developing the duplicate to a lower contrast because of the resulting loss in color brilliance, the contrast of the original transparency is reduced instead by means of masking. A thin negative is made from the original transparency. This mask is then placed in register with the original, and the duplicating material is exposed through the sandwich.

The contrast softening effect of a mask on a transparency is shown schematically in Fig. 1. Assuming a gamma of 1.6 for an original Ansco color transparency, and of .4 for the negative mask, the gamma of their combination is that of the curve representing the sum of

† From a paper presented at the PSA Convention, Cincinnati, Ohio, November 4, 1948.

* Ansco Product Service Laboratory.

the densities of the two others. This turns out to be, in our case, 1.2, or the difference between the gammas of mask and original. A sandwich gamma of 1.0 would, of course, theoretically be the most desirable, since by combination with the gamma of the duplicating material it would lead to a duplicate of exactly the same gradation as the original. However, for the sake of clean highlights it is recommended that the duplicate be slightly more contrasty than the original.

In reality the situation is somewhat more complicated than in the schematic representation. The densities of the original do not fall entirely on the straight line portion of the characteristic curve, but extend into the toe and shoulder regions. The thin mask actually affects only the middle tones and highlights of the original, while the shadows remain unchanged. Flattening of the middle tone gradation is wanted. The highlights, lying on the toe part of the curve, are already compressed and further flattening may be undesirable. However, this could only be prevented by intricate double masking.[4] Flattening of the shadows would be desirable, but would require a denser, longer-scaled mask. Such a mask, however, has proven to be extremely critical to register with the original. Therefore, and to prevent complication of the process, the thin mask was chosen as a compromise.

As shown in Fig. 2, a long-scaled panchromatic negative material is exposed in such a way that 3 minutes development at 68° F. in a soft working borax developer like A-17 produces a maximum density of about .5. The use of a plate rather than a film for the mask is strongly recommended to exclude registration difficulties caused by dimensional changes of the mask. The light source is a 3200° K or an ordinary enlarger lamp.

Before the mask is made, the original transparency should be conditioned for about twelve hours in the working room to permit the film base to come to an equilibrium with the room conditions. It is important to maintain these temperature and humidity conditions in the working room to avoid dimensional changes in the transparency which would, of course, impair its exact registration with the mask. Keeping the sandwich under a heavy weight between exposures was also found helpful in maintaining registration.

Aside from contrast improvement there is another beneficial effect which this mask is to have on the duplicate: it is to exert a minor degree of brightness correction. The inefficiencies of the absorption characteristics of the dyes which form the three images in monopack color materials are well known and are extensively described in the literature.[5] Suffice it to say here that, obviously, printing a color transparency on the same material it was made on will double the color distortions present in the original. The blues will suffer most. Being produced by the two most imperfect dyes in the film, the magenta and the cyan, they will tend to be too dark in the duplicate. This situation can be improved, the blues can be lightened by restricting the density of the mask in blue areas. A blue absorber, a yellow filter, will do that. Therefore the masking material is exposed through a Wratten G Filter.

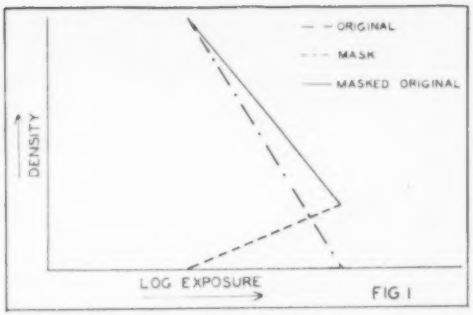


FIG. 1. The contrast softening effect of a mask on a transparency.

The transparency and the mask are registered emulsion to emulsion. The duplicating material is then exposed through the sandwich (as shown schematically in Fig. 3). The light source has to be of the color temperature for which the duplicating material is balanced. Either tungsten or daylight type Ansco Color Positive film may be used. The former requires a 3200° K source, the latter this same source filtered with the Ansco Conversion #10 filter. Fine adjustments of the color balance of the exposing light may be necessary due to lenses or reflectors in the light system not being entirely neutral. Such adjustments are made by means of Ansco Color Compensating filters, the same filters used for that purpose in Printon printing. These filters also provide an easy

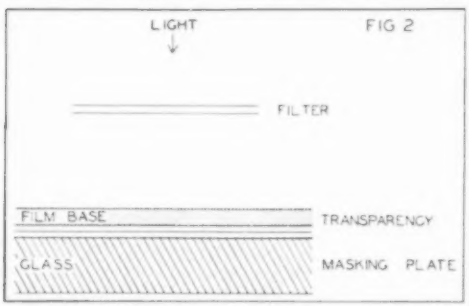


FIG. 2—Above

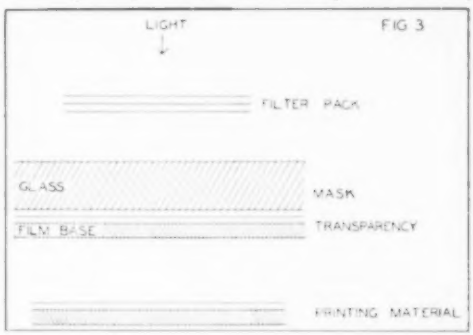


FIG. 3—Right

means of overcoming the possible prevalence of one color in the original transparency.

The exposure should be such as to give a duplicate of correct density with normal development. Tungsten film is the preferable material; it requires only one-quarter the exposure of daylight films, since it is exposed without the Conversion #10 filter. For contact duplicates a point light source or directed light should be used, since printing will be through the film base of the original.

The duplicates obtained in this way cannot be expected to be perfect. Nevertheless, they stand surprisingly well the toughest test any duplicate can be subjected to: that of being viewed side by side with its original. In spite of the short-cuts taken for the sake of simplicity, the method described is capable of yielding enjoyable and often surprisingly faithful duplicates from a high percentage of the transparencies encountered in practice.

References

1. Duerr and Harsh: Ansco Color for Professional Motion Pictures. **J.S.M.P.E.** *46* (1946) p. 357–367.
2. Harsh and Friedman: New One-Strip Color-Separation Film in Motion Picture Production. **J.S.M.P.E.** *50* (1948) p. 8–13.
3. E. Loessel: Recent Developments in Printon. **P.S.A.J.** *14* (1948) p. 47–49.
4. R. P. Speck: An Improved Masking Method for Color Transparencies. **P.S.A.J.** *11* (1945) p. 461–66.
5. Friedman: History of Color Photography. Chapter on Masking.

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psa JOURNAL

Motion Picture Section

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The Newsreel

That peripatetic cinematographer, Ralph E. Gray, APSA, having exhibited his well known films of Mexico to such crowds as 450 in Cincinnati, 500 in Dayton (preceded by a dinner at which there were several hundred), 300 in Columbus, spent the holidays in Guatemala. On route a few weeks were spent in Florida.

Slick Airways, Inc., has produced a 16mm color sound film, "The Story of Air Freight," on the development of the air freight industry. Prints are available for public showing.

So popular has the Annual Salon of the San Jose Movie Club become that it is now necessary to present identical showings on successive nights. This year four 8mm and six 16mm films made up the program. Incidentally, Tom Costley, the club's man of all work, having received a promotion to district manager of a large grocery chain, has moved to San Francisco. Emerson Owen is President of the San Jose club.

Aviation Training Staff of the Civil Aeronautics Administration is distributing more than 600 motion pictures and film strips which deal with aviation. They can be obtained through any of the CAA regional offices.

Harris Tuttle, MP I vision Chairman, with Mrs. Tuttle, is attending the football coaches conference in San Francisco during January. While in the Pacific Coast city he will give talks on movies to clubs in San Francisco, Oakland and San Jose. Later he will move on to Southern California where a meeting of the MP Division Executive Committee will take place, probably in Hollywood.

Visual Story Productions, of Hollywood, has completed a color and sound motion picture for Union Pacific Railroad on safety at rail crossings. Said to be the most spectacular of all Union Pacific movies, it features a genuine train wreck which is the real thing and not done with mirrors or miniatures. Werner Jannsen, conductor of the Portland (Ore.) Symphony Orchestra did the musical score. Vincent Hunter, APSA, manager of the UP Photographic Dept. was in charge.

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Them Was the Days—Part II

By Jesse H. Buffum *

The early-day newsreel developed lensmen of ingenuity and skill whose contribution to the history of the cinema was outstanding

The newsreel cameraman was a most zealous factor in the meteor-like development of the motion picture in the early days, but he had virtually no rating, and certainly was never called a "cinematographer." The elect were the studio boys who worked for producing units—a high estate at which I finally arrived, but only by the toilsome route. It is of some of those rough experiences, and real adventures, that I now write.

I got a day off from negative developing at the Edendale studio of Bison 101, and took my newly-acquired movie camera out to Ascot Park where the great annual school pageant, with thousands participating, was being staged. I found that all movie rights had been sold. Because my dilemma was on moral grounds (a public school event belonged to the public), I set about getting in. Not one newsreel, but two, would get this event, I determined.

The tripod was out—it would be too easily spotted so I hid it. The cops found it, and the grand manhunt was on for the lens outlaw, who must be somewhere in the vast audience. He was, and comfortably and safely seated in the bleachers, with a conniving femme's skirt draped over his movie camera. Friendly sympathizers moved about to make an open space for directional purposes. I got some dandy shots and sold the stuff to Pathe for a dollar a foot. And in 30 days I was on the Pathe News payroll.

Let's follow along this newsreel trail and pick up some of the highlights. They were all adventures to me because I was young and enthusiastic. And full of ideas. One of these was that movie stars belonged in a real sense to the people, and that they should appear in newsreel releases now and then. I fought for this and without success, until I got to the top, which meant Mary Pickford in those days. I sold her on the idea; and many was the time she and I framed up "events" of newsreel importance, particularly in the formative days of the first World War.

Then I ran into Joe Walker again.

Mary Pickford registering varied facial expressions for the camera.

He was doing some fantastic and incredible shooting from airplanes (crates, to you, in that era), and in that way got to know Glenn Martin. So to Martin's "plant" we went for a newsreel shot of Glenn selling a plane to the Dutch government. They were made, one at a time, in that shed-factory then. Martin waiting for his pay from a sale before beginning on another.

Schumann-Heink

Perhaps the finest friendship I had in those years was with Schumann-Heink. I shot her at an open-air appearance in Los Angeles, and followed this up with a personal appointment, for a special newsreel scene, at her home near San Diego. It was not my last visit in her home. Once she dismissed the servants and cooked the dinner for me herself. She was proud of her housekeeping. Stills made of her in her home—never yet published—are a prized possession. She wanted me to join her son in a cinema business venture at one time, but the deal did a fadeout.

My newsreel territory for those years was virtually the entire Southwest, and I managed a wide coverage. Shot the horseracing at Tia Juana each season, and a bull fight or two. So once each week, at least, I was at San Diego as my base, working out of there as far east as El Paso, and north up into Utah.

But the Imperial Valley earthquake was tops among the several tremors I had some part in. I got out of a sick-bed in San Diego, when I could not contact my Los Angeles headquarters for a sub cameraman, and went over the mountains to Imperial and Rawley, where a quake of

* Columbia Broadcasting System, Inc., Station WEEI, Boston.

Madame Schuman-Heink and granddaughter.

major violence had occurred. The San Andreas fault runs along under that section, and Old San had kicked up his heels mightily.

The entire town had been leveled, as I remember it, not a whole building left. At the edge of town a committee met me and said "no photographers!" "I am not here to film your disaster," I replied, "but to show how resourceful you are in rising out of it."

That little speech got me everything I wanted: such as the hospital functioning outdoors in a vacant lot, even to a major operation being performed, and a childbirth in full swing with not a one self-conscious about it; Superior Court in what had been an alley between business blocks, jury and judge sitting on nail kegs. No children crying, no women wringing their hands, no men disconsolate —just everybody pitching in and demonstrating indeed how the Imperial Valley does it.

The Flying "Coffin"

Two Army airmen, both officers, left North Island in a flying coffin (I am quoting) for an appointment due east in Arizona. They did not arrive. The experts figured out the number of gas hours, and pronounced the pair down and probably dead. So the hunt was on. Cavalry came up from Fort Bliss, search planes galore from Coronado, citizens by the hundreds volunteered, and sheriffs rounded up large posses. A noted plainsman-scout was put in charge, topping even the army command. Selig-Tribune newsreel (me) joined up with a movie camera or two.

Deep in the Sonora Desert, based at a U. S. emergency cavalry camp, I was guest of the colonel, and on the spot when they brought the first airman out. Lost in the clouds, their compass off because of flying over Magnetic Mountain, they landed when they saw a body of water they thought was Arizona's Salton Sea. It proved to be the arc of Magdelena Bay, way down in Lower California, hundreds of miles from a human being.

They started to walk north, each swearing to keep on if the other went down. This happened; and one man was found with a knife poised above his heart, lying there trying to catch a bit of rain water with his leather jacket. He had mistaken our patrol for a possible bandit, with which even the remotest deserts are infested at times. When we brought him out to the line of railroad east of Yuma, he was as helpless as a paralytic—eyeballs rolling and unable to speak. By massing on the railroad track we stopped the Golden State Limited, and put the injured man aboard. His comrade walked into Yuma 48 hours later, in pretty good condition. My priceless film record of that desert epic was so full of static that Selig-Tribune could not use it. But came a raise in pay and high praise from the editor, Jack Wheeler.

The Bane of Static

Static was the bane and often the nemesis of the movie industry for years, particularly in cold weather. All manner of clever devices were contrived, particularly by the newsreel men, and then the problem went to the laboratories. Out came X-Back film, as the purported answer. But it cost 10c a foot, while ordinary raw negative cost half that, and the entrenched studios grabbed off all that could be manufactured. Hence I lost another, and this time far more costly, "event" than all predecessors: my expensive trip down into the Grand Canyon.

With Selig-Tribune paying the bill, I outfitted at El Tovar with pack animals, a special guide, etc. This was my third visit to America's top wonder; and I wanted to film the great natural marvel in mid-winter, with the river running high. Near the foot of Bright Angel and on the Colorado's brink, we camped for several days, while I risked my outfit shooting scenes a mile below the canyon's rim. I got some really great stuff.

Coming back up and on the rim again, my mule went berserk with a deliberate attempt of suicide. (It came out later that he had thus performed twice before.) With me astride he made straight for the brink, across a stretch of open snow-covered field. With my guide frantically pushing his mount to head us off, the mule and I headed for eternity, but 200 feet away. Through a whirl and a haze and a failing consciousness I barely heard my guide shout: "Fall off, fall off!"

As I lay in a comfy El Tovar bed next morning, an anxious nurse hovering near, I heard two quick shots out in the corral of the hostelry. My mule had gone where I almost went. My film, secured at such great pains (!!!), was worthless. Static!

It was as much showmanship as piety that made Henry Van Dyke choose Mount Robideaux for the first Easter Sunrise Service in America. His "God of the Open Air" became an essential part of the permanent ritual. You could get nearer to God on some more lofty nearby peak, but you could not so handily get the crowds there. And crowds there were. They came the night before, and slept on the Mount to await the dawn. Careless rival newsreel men with poor timing were not able to make the summit for the service. I set up my several cameras the night before at picked locations with an operator at each of them, supported by stalwart guards. And this was fortunate, because my stands were sometimes contested. I personally waited for the official car from the Mission Inn, a little matter of prearrangement, and gangway was thus assured.

Much of my work was along the news-fertile Mexican border. Once

I waited 30 days at El Paso for Pershing to go in on his punitive expedition after Villa, filling in the time shooting troop movements in and out of Juarez across the river. One day they brought in the body of a famous insurrecto general, Baca Villes, and made a gala occasion of it in the open square of Juarez. I cranked away. Out stepped the undertaker, who stripped the rebel chieftain, and deftly slit open his abdomen—right in front of women and children as well as troops and Mexican citizens. My camera stopped. And then the crowds noticed me. Americanos were in disfavor at that time, and feeling ran high. I was plainly in a tight spot. The crowd became hostilely demonstrative. Suddenly, up drove the Mexican consul at El Paso, who shouted to me to jump into the pheaton with him. I saved my camera and my hide, but barely.

Similar was another experience in Juarez a day or two later. This time I got permission from the Mexican authorities to film the departure of an important infantry unit bound for a Villa entrenchment. From the top of an empty box car against a stop-bumper on a siding, I shot the humanity-laden freight train pulling out. On the roofs of the box cars and on the rods underneath were jammed everything the Mexican soldier had to his name—wives, children, household goods, pets and whatnot. My cranking was mingled with hisses and jibes, and in a strange tongue they shouted at me I knew not what. Only, whatever was said was not friendly. Then a smartly uniformed young lieutenant of the Federal army, who an hour before had paraded his squad for my camera, came yelling at me to "Guarde! Guarde!," forgetting the English he well knew. A locomotive was coming at speed down the track at my box car, and I saw the inevitable. I threw my camera and myself flat, hugging the catwalk. The crash came, and the near end of the box car was stove in. I was knocked to the ground, 12 or more feet below. You can drop the curtain on the ambulance that hauled me across the international bridge to El Paso.

Then there was the battle of Agua Prieta; a dramatic balloon ascension at Arcadia on the old Santa Anita Rancho; Wrigley and his Chicago Cubs at the Hotel Green and later on Catalina; Corpus Christi after the war, with its sea bird rookeries and herd of sea elephants; Wilson's second inauguration; and the sheep dip for Mexicans out on the Arroyo Seco. All a part of the day's work for the early newsreel cameraman.

(To be continued)

QUESTION BOX

How can I calibrate my reflection type meter so that I can read incident light values in footcandles? — P.R.D., Cincinnati, Ohio.

Perhaps the simplest method is to use direct June, noon-day sunlight as the standard for calibration.

The intensity of bright sunlight with blue sky on a clear day in summer is approximately 9000 footcandles. If the standard meter normally supplied is pointed directly at light of this intensity, the needle would go away beyond its normal scale and the meter might be damaged. Therefore, the light intensity falling on the cell must be reduced so that the needle can operate within the range of the normal scale.

This can be accomplished by placing a piece of neutral density filter of approximately 1.5 to 2.1 density over the cell window. The neutral density required will depend upon the sensitivity of the meter. A neutral density of 1.5 can be tried first. The meter can now be pointed (with caution) directly at the sun. If the needle does not go to the end of the scale, a neutral density of 1.2 can be tried. If the needle starts to go beyond the end of the scale, try a neutral density of 2.1. If this is too great, a density of 1.8 should be tried. If still too much, other pieces of lighter density, .1, .15, or .2 can be added to the selected density until a combination is found that does keep the needle near the end of the exposure meter scale.

Since the neutral density selected will be bound between a piece of opal glass and clear glass, the test to determine proper density should be made with the two pieces of glass over the meter window which will later be used to bind the neutral density. Since some light is absorbed by the opal glass, this should be taken into consideration in selecting the neutral density required.

The selected density or combination of densities can now be sandwiched between the opal and clear glass, and the combination taped together with lantern slide binding. The glass, of course, as well as the filters, should be cut in advance to proper size so that they just cover the cell window. The binding tape should not mask the cell window. The neutral density filters now mounted in the opal glass can be placed over the cell window and securely taped to the meter. The meter is now suitably adjusted to read incident light.

The meter can now be pointed directly at the sun and the position of the needle can be indicated as 9000 footcandles by placing a mark on the meter scale. In most cases the standard division on the meter scale can be used to indicate other light intensities in footcandles.

(© United Artists Corp.)
Charlie Chaplin

psa JOURNAL

Book Reviews

Magic Shadows, by Martin Quigley, Jr. Georgetown University Press, Washington, D. C., 191 pages, cloth, $3.50, 1948.

Starting with Aristotle and ending with "World Premiers" in 1896, "Magic Shadows" traces through the centuries man's efforts to create pictures that moved. From the vast literature of history, physics, and optics, has been assembled the discoveries of Leonardo da Vinci, Kelper, Kircher, Plateau, and many others, whose contributions to scientific knowledge made the first motion picture possible.

The 17 chapters are followed by 14 pages of chronology and 8 pages of bibliography that add much to the practical value of the book for those who desire to delve further into motion picture history.

The movie maker interested in the story of the pre-history of the motion picture will find "Magic Shadows" informative and interesting reading.—ASN

AMERICAN ANNUAL OF PHOTOGRAPHY, Vol. 63, 1949; American Photographic Publishing Co., 353 Newbury St., Boston 15, Mass., 240 pages, 7¼ x 9¾, illustrated, paper, $2.00, cloth, $3.00, 1948.

This 63rd edition of a long-established photographic "Annual" upon which generations of photographers have cut their eye-teeth is of familiar form and excellence. Of especial interest are illustrated articles on the work of the late Alexander Keighley and on the present portraiture of Yousuf Karsh, FPSA, whose techniques vastly are different, but whose photographs equally are enjoyable. Readers will welcome the customary presentation of outstanding photographs, all carefully explained, and of salon records. Georgia Engelhard presents an informative illustrated article on child photography, and Eleanor Parke Custis, FPSA, discusses the relationship of sharpness and pictorialism. Alda Jourdan reveals what can be done in each and every month with plant photography. As usual, the "Annual" is both informative and inspirational.

PALESTINE, LAND OF ISRAEL, Ziff-Davis Publishing Co., 350 5th Ave., New York 1, 128 pages, 7¾ x 11, illustrated, cloth, $5.00, 1948.

So much has been said and written about Palestine that this book of 150 credible photographs by Herbert S. Sonnenfeld contributes greatly to understanding of Palestine and the Palestinians. The photographer skillfully has employed pictorial techniques to tell in pictures an interesting, and highly important story—that of the restoration of Palestine within 30 years by young Jews from all the world's countries. Indeed, Sonnenfeld tells the story in pictures so well as to make the text seem crassly propagandistic. Photographers will view this book with interest, not only to get a glimpse of the possibilities of photographic reportage, but to see how an old country, made new, looks through the lens. This fine book suggests that the broadening use of photography is going to call for new techniques in editing lest what is achieved by the camera be discounted by the typewriter.

AMATEUR PHOTOMICROGRAPHY, by Alan Jackson; The Focal Press, Inc., 381 4th Ave., New York 16, 184 pages, 4¼ x 7¼, cloth, illustrated, $2.75, 1948.

Amateurs looking for new fields and subjects easily can get into photomicrography. They merely buy some spectacle lenses from the optician or dime store, mount them in filter-holders, attach them to the camera, and start shooting in black-and-white or color. Subjects will be tiny objects once beneath their notice, even invisible to the eye. Once bitten by the bug, the author goes on to say, the amateurs can go as far as they like, or can afford, in combining their cameras with microscopes of high power and low. Eventually they will barge into fields populated by chemists, biologists, metallurgists, criminologists, philatelists, and engineers, where they will be photographing finger prints, microbes, beetles, pollen, sponge spicules, moth eggs, and such. This book is not alone for the hobbyist; it contains much of value to professional photomicrographers and researchers.—VHS

THE RIGHT MOMENT IN ACTION PHOTOGRAPHY, by Alex Strasser, The Focal Press, Inc., 381 4th Ave., New York 16, 56 pages, 4¼ x 6½, paper, illustrated, 50¢, 1948.

Convenient pocket volume on action photography, with comprehensive data on how to select the right moment and proper exposure.—VHS

ARCHITECTURE AND YOUR CAMERA, by R. M. Fanstone, The Focal Press, Inc., 381 4th Ave., New York 16, 56 pages, 4¾ x 6½, paper, illustrated, 50¢, 1948.

Helpfully simplified data on and suggestions for architectural photography covering the field and fitting the pocket. Diagrams show how to approach subjects and to use swings and tilts.—VHS

ONE LAMP ONLY AND THE SECOND LAMP, both by Hugo van Wadenoyen, The Focal Press, Inc., 381 4th Ave., New York 16, 56 pages, 4¾ x 6½, paper, illustrated, 50¢ each, 1948.

Two books of concentrated information, with step-by-step instructions on how to make the most of subject and artificial lighting, helpfully simplified.—VHS

PHOTO-LAB-INDEX, Quarterly Supplements Nos. 36–37 and 38, by Henry M. Lester, Morgan & Lester, 101 Park Ave., New York 17, 208 and 96 pages respectively, 5½ x 8, $3.00 per year.

The combined second and third issues, Nos. 36–37, present revisions of Sections 6, 8, 9, 10, 11, 14, 16, and 21, largely reporting changes in Kodak materials. No. 38, the final 1948 Quarterly Supplement, includes a new General Alphabetic Index to replace Sectional Indexes, now discontinued, plus revisions of Sections 4, 10, 11, 14, and 19.—VHS

COMMERCIAL PHOTOGRAPHIC LIGHTINGS, by Charles Abel, Greenberg Publisher, 201 E. 57th St., New York 22, 272 pages, 7¼ x 10½, cloth, illustrated, $7.50, 1948.

In this comprehensive manual of lighting and arranging widely varied types of commercial subjects, with copious photographs and drawings, professional photographers will discover how 77 competitors solved tough problems, and amateurs will learn how professionals arrange subjects, cameras, and lights for certain results. For each of the 120 demonstrations the objective is stated, a photograph shows the final result, and diagram and text outline the problem and its solution. The author has made a substantial contribution to photography by inducing numerous experienced professional photographers to explain, as exactly and completely as possible, how they made successful studio object, exterior, interior, live model, still life, and copy photographs. —VHS

PHOTOGRAPHING MEXICO, by Cecil B. Atwater, The Camera, 306 North Charles St., Baltimore, Md., 128 pages, 6 x 9½, cloth, illustrated, $3.50, 1948.

Here is a book combining photography, travel, history, and human interest by an American who has photographed Mexico from Nuevo Laredo to Acapulco, and from Tehuantepec to Mazatlan, and, with each exposure, has become increasingly enamored of Mexico and the Mexicans. Now he desires that others, by reading or by actual travel, shall find similar pleasures south of the border. Dozens of Mr. Atwater's own pictorial photographs make the volume simultaneously credible, enjoyable, and no little provocative of reader desire to visit, to see, and also to photograph this friendly, beautiful country across the Rio Grande. Travelers who want warmth and personality in modern Baedekers will find it here. Peripatetic photographers who desire advance tips on camera requirements will be fully informed and inspired. —VHS

BETTER NEGATIVES, The Camera, 306 North Charles St., Baltimore, Md., 192 pages, 6 x 9, cloth, illustrated, $3.50, 1948.

Second volume of the "Camerette Photo Library," this book, jointly the work of Eugene Hanson, Thomas Hill, Grace Hooper, Mark Mooney, Jr., Samuel Priest, Jane Smith, Lloyd Varden, and the editorial staff of "The Camera," comprehends all the essential knowledge of negative-making which the average photographer could possibly digest. It is at once a book for reading and for reference. It presents, by means of text, photographs, diagrams, charts, and tables, the essential steps in making better negatives, not according to anyone's pet theory, but as recommended by long years and broad experience in photography. Photographs and diagrams facilitate following every step, even in the more complicated operations, and there are many tips and hints for easier, better ways of doing things.—VHS

DISCHARGE LAMPS FOR PHOTOGRAPHY AND PROJECTION, by H. K. Bourne, Chapman & Hall, Ltd., 37 Essex St., WC-2, London, American Photographic Publishing Co., 353 Newbury St., Boston 15, Mass., 424 pages, 5½ x 8½, board, illustrated, $12.00, 1948.

The author, an electrical engineer, lamp designer, lighting researcher, and photographer, describes in detail the design, construction, operation, and photographic applications of electric discharge lamps—filament, carbon arc, mercury vapor, fluorescent, flash, and others. The first chapter deals with photographic light sources, the 13th, and final, with their applications. Appendices present glossary, definitions, nomenclature, and other technical data. The book is based upon the experience of the author and others in laboratory and field. The volume comprises basic reading for the technologist, who will find the author's combined knowledge of lighting and photography to be particularly informative.—VHS

Salons Can Point the Way!

By W. Dovel LeSage

Salons will improve when jurors know how to distinguish between true artistic effort and photographic stunts based on technical ability

With the return of the world to peace-time pursuits, the increasing availability of photographic equipment and supplies, and the re-establishment of international relations, pictorial photography should gain a new impetus and could, under favorable conditions, enter the golden era of its development.

Ordinarily, the progress of a widespread activity is the composite of the efforts of many individuals, each working separately, but actuated by a common interest. Photographic pictorialism is no exception, for, in fact, it constitutes one of the best examples of independent effort on a large scale.

Art, as applied to photography, consists of aesthetic self-expression by means of that particular medium. However, while self-expression is closely akin to the personality of each individual and will differ in many respects, yet there are certain artistic fundamentals which are necessary to the greatest success of the aspiring pictorialist.

Fortunate is he who has the advantage of personal instruction from a competent teacher, capable of imparting a firm grounding in the technical and artistic aspects of the subject. Failing in that opportunity, the interchange of information and the constructive criticism afforded by camera clubs and the PSA portfolios are important factors in the development of pictorial ability.

Equally valuable are the reading of good books on the photographic subjects in which one's chief interests lie, and the study and analysis of good pictures, not only those produced with the camera, but the other graphic arts as well. Especially should this study include the "old masters," for they contain ageless qualities which outlive the fads and fancies that intrigue for a relatively short time but ultimately pass into oblivion.

The importance of salons and exhibitions cannot be ignored in any serious discussion concerning the outlook for pictorial photography. They constitute the chief outlet for the work of the advanced pictorialist, and to those who aspire to exhibitor rank, they offer an incentive to diligent effort.

Joint Responsibility

The success of a photographic exhibition is dependent upon both the group that sponsors it and the photographers who submit their work to it. Without the salons, there would be no inspirational outlet for that vast body of pictorialists to whom exhibiting is the culmination of their efforts. Equally obvious, if the salons received no patronage from potential exhibitors, they would fail for lack of support.

The more influential a person is in his sphere, the greater is his moral obligation to exert that influence in the right direction. Thus it is with organizations as well, from which the various salon groups are not, nor should not, be exempt. Exhibiting is probably the largest single activity in the pictorial realm and certainly the one to which the most importance is attached by the majority of those directly concerned. The influence of salons is two-fold in nature — directly, through the camera artists themselves and, indirectly, through the public visitors in attendance at the exhibitions.

A well-patronized, efficiently-managed salon can be a definite asset, culturally speaking, to a community. By those who are acquainted with pictorial photography, it is accorded a merited position alongside the other and older graphic arts. Unfortunately, the facility with which casual

BITTERSWEET — W. Dovel LeSage

photographs can be made and the universality of the use of the camera for such pictures, has led to a widespread belief that the medium is a purely mechanical one, incapable of producing works of art. Therefore, salons that contain classic examples of pictorialism, as differentiated from the "glorified snapshot" variety, will do much to dispel the popular misconception concerning the status of the medium and will tend to elevate it to its proper level among the kindred arts.

Important as is the influence of salons on the cultural education of the public and on the standing of photographic pictorialism as a branch of the arts, an even more vital influence is that which is exerted on the pictorialists themselves. Among the ranks of the body photographic that indulges in salon exhibiting are found workers of every degree, from the seasoned pictorialist, well-versed in artistic fundamentals and a skilled craftsman, to the budding camera artist approaching the salons as a proving ground for his work and as a source of guidance for his further development. It is on this latter group that the character of the exhibitions will have the greatest influence and concerning whom there is a commensurate moral obligation and responsibility.

Much has been said, and justifiably, of the questionable standard of a large portion of present-day salon photography. To be acceptable to many jurors officiating at this time, a print must have the quality of what has been aptly termed "impact." All too frequently, this command to immediate attention is gained by poster-like dimensions, exaggerated tone values and novelty, albeit superficiality, of subject matter.

The frequent and widespread inclusion in our salons of inartistic work sets a bad example for the newcomers, who are in a formative stage, and likewise exerts a degrading influence upon those more experienced workers who are tempted by the glamour of high exhibiting scores, to abandon their artistic ideals. If this retrogression in photographic pictorialism is permitted to become mistakenly accepted as progress, by the uninitiate, the status of photography as an art medium will definitely suffer a set-back and lose some of the position it has so arduously gained.

The Ideal Juror

Salon groups can do much to correct the present alarming trend by a careful consideration of their juries of selection. The most valued assets of a qualified juror are a broad cultural background and a maturity of artistic judgment. He should be able to divest himself of any predilection for any special subject matter and have a knowledge of all the branches submitted, in order that the final presentation may be diversified and well balanced. He should be conservative in his artistic taste, tempered with a breadth of vision — a combination of attributes which will permit him to distinguish between the occasional true artistic effort which violates traditional tenets and the many spurious varieties which frequently are merely photographic stunts attesting more to the technical ability than to the artistic conception of the makers.

The high percentage of prints at latter-day exhibitions that leave much to be desired from an artistic standpoint, constitutes an indictment of the ability and qualifications of the jurors with whom they evidently found favor. Unfortunately, the acceptance of such work begets the production of still more of it and so on — ad infinitum.

However, no one will continue, for long, to submit that type of picture to the salons which does not find a fair degree of acceptance at their hands. Consequently, if jurors are obtained who are capable of judging the artistic evaluation of the entries, the complexion of the hangings will change accordingly, and just as inevitably, albeit gradually, will there be an improvement in the aesthetic value of subsequent work produced for exhibition purposes.

Nor should salon committees consider that their obligation has been discharged by the securing of competent juries. The jurors of an exhibition merely serve the members of the salon group whom they represent on that occasion, and the final responsibility for the outcome of the show rests with the ones who organized it. Consequently, it behooves the salon sponsors to confer closely with the personnel of their jury, to convey the policies of the organization and the ideals they are striving to attain in the exhibition.

If the many groups who sponsor and conduct photographic salons will recognize the magnitude of their influence on photography as an art, and will accept and react to the responsibility that rests upon them, photographic pictorialism will be assured of a secure position among the graphic arts.

INTERMISSION — W. Dovel LeSage

PHOTO-TECHNOGRAPHY

Articles and News of the Technical Division of the Photographic Society of America

Motion Picture Photography at
*TEN MILLION FRAMES PER SECOND**

By Brian O'Brien and Gordon Milne †

To expose a conventional motion picture at a speed of several million frames per second would require a speed of film movement of the order of 200,000 feet per second for 16 millimeter film, a rate entirely beyond anything attainable at present. As an alternative the image may be swept across stationary film at speeds much higher than it is possible to move the film itself, but this procedure imposes a very serious limit upon the length of film and hence the number of frames which can be exposed.

The required film or image speed could be much reduced if the conventional shape of the motion picture frame were altered to make the dimension along the direction of film movement very small. If at the same time the dimension across the film were increased a corresponding amount to preserve the same picture area, the same total number of just resolvable picture elements might be retained. In the camera to be described this change of image shape is accomplished by a stationary optical system through which the motion picture negative is exposed. After processing, the negative film is printed by projection through a similar optical system which reconstructs the image back to the shape of the original object and thus to the approximate proportions of the normal rectangular motion picture frame. In this manner motion pictures in excess of ten million frames per second have been produced with very moderate film velocities, the arrangement permitting the photography of a very large number of motion picture frames in a single sequence. By the use of an automatic printer the final positive is presented as a standard 16 millimeter motion picture print.

The optical system changes the shape of the picture by cutting the original image of the object into a series of narrow strips, redisposing these strips end to end and reimaging them as a single long strip extending across the motion picture negative film. We have termed this process image dissection, and the optical system which accomplishes it an image dissector. The basic idea of cutting an image into strips is not new, and methods for accomplishing this have been described by Walton.[1] However, to meet the requirements of ultra-speed photography it has been necessary for us to devise a new type of optical system.

The principle of the image dissector is shown in Figure 1. Consider a number of small identical objective lenses, L, as shown in Figure 1 with their optic axes perpendicular to the plane of the paper. For convenience these lenses are cut with flat edges and blocked together as shown. If the line joining their centers is slightly inclined to the horizontal, and a distant event is viewed by these lenses, each will form a separate but identical image of the distant event, and these images will appear as a flight of steps as shown in the upper part of Figure 1. If these images are received on a metal plate containing a narrow slit, S, which is not inclined but truly horizontal as shown in the figure, it is evident that this slit will pick just the top of the picture from the first image, a strip of the picture next below from the second image, next below that for the third image, etc. Since all the images are alike

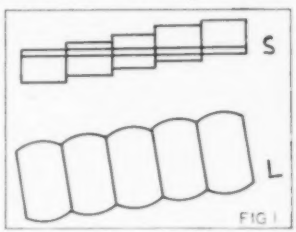


Fig. 1. A multi-lens unit L and its images on a slit S, illustrating the method of image dissection.

* Presented Dec. 3 1947 before the Rochester Technical Section, PSA, at the Chamber of Commerce, Rochester, N. Y.

† Institute of Optics, University of Rochester.

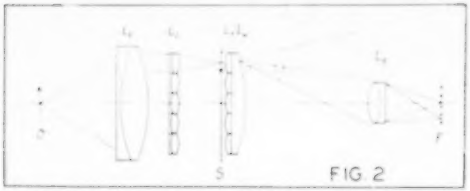


FIG. 2. Optical arrangement of a 5 element image dissector as used for near events.

it will be evident that the various parts of the slit from left to right carry the equivalent of one complete picture of the event.

This we have referred to as image dissection, and in the example shown in Figure 1, the rectangular image is dissected into five narrow strips which are assembled end to end to form one long narrow strip which passes through the slit. If this narrow strip is imaged on photographic negative film which is moving in a direction from top to bottom in Figure 1, it will be seen that vertical streaks will be formed on the film, their position corresponding to the light and dark portions of the original picture. If the slit is made sufficiently narrow, and the number of lenses sufficiently great so that the whole picture is represented entirely in this narrow slit, then the blurring of the picture which results from the motion of the film cannot be greater than the width of the slit, and this in turn can be made as small as the finest detail which the photographic negative is capable of resolving.

While such a streak negative could be analyzed and the necessary information secured from it for many scientific purposes, it is far more convenient to print the negative back on to positive film by projection through the very optical system which formed it. In this manner the picture is rectified from streak images back to an ordinary frame of motion picture film. Each position of the slit across the negative film gives a new frame of the final motion picture.

A schematic diagram of the complete optical system is shown in Figure 2, including the provision for photographing an object which is not at infinity. Light from the object at O is collimated by the first objective lens, L_1, and then received by the multiple objective lens system, L_2. These lenses form the multiple images in the plane of the slit, S. The image of the slit, S, is formed on the film at F by the main lens L_3 which must be a very well corrected photographic objective. In order that the pupils of the multiple optical system shall fall on the final objective L_3, two sets of specially designed field lenses, L_3 and L_4, are mounted very close to the plane of the slit. By this arrangement the effective photographic speed of the combined optical system is equal to the photographic speed of the lens, L_3, subject only to surface reflection losses of the lenses L_1 to L_4 inclusive. These reflection losses can be made quite small by suitable non-reflection treatment. In the present camera the final lens, L_3, is a photographic objective operating at f 2.0.*

In our Model I camera there are fifteen small objectives L_2 instead of the five shown in Figure 2. When used with a single slit at S this produces a final picture having a total of fifteen elements only. To increase the number of elements multiple slits may be used. Referring again to Figure 1, if the inclination of the line joining the centers of the lenses L, be reduced to one-half, and if the slit width be reduced to one-half, then it is evident that only the upper half of the original picture will be covered by the five slit elements. Suppose now that a second slit be placed parallel to S but spaced below it by just five times the width of either slit. Under these conditions with a single set of five lenses L, the number of elements of the final picture will be doubled, the first slit taking care of the upper half of the final picture and the second slit, the lower half. Photographs of the complete image dissector with single slit are shown in Figures 3 and 4, without the final photographic objective, L_3. A photograph of the double slit system is shown in Figure 5. Although the two slits are very close together, their images on the final negative film must be widely spaced to avoid overlap of the streak image. This is accomplished by the reflecting prisms shown in the top and bottom right of Figure 5, which are provided with small micrometer screws to adjust their position. With the arrangement shown in Figure 5 a thirty element picture is formed.**

* This lens is a Kodak Ektar of 45 millimeters focal length, designed for objects at infinity. It is here required to work at 5 to 1 conjugates. Mr. F. E. Altman, of the Eastman Kodak Company, very kindly arranged for a supplementary lens system which is used in front of the Ektar lens to permit the latter to operate at its designed conjugates.

** The small objectives, L, although simple cemented achromats, must be of good quality. Mr. L. V. Foster, of the Bausch and Lomb Optical Company, very kindly arranged for the procurement of the optical elements of the Bausch and Lomb 40 millimeter microscope objective which proved very satisfactory.

FIG. 3. Left. Fifteen element image dissector. The slit jaws may be seen as a faint dark streak through the multi-condenser unit. Above this is a device for placing fiducial marks on the negative. The multi-lens unit is largely concealed, but its focusing adjustment shows prominently (large knurled head in foreground). FIG. 4. Center. Fifteen element image dissector viewed from object side. The end of the multi-lens unit may be seen near the middle of the picture, and below it the thumb screw for adjusting tilt. FIG. 5. Right. Image dissector with double slit in place.

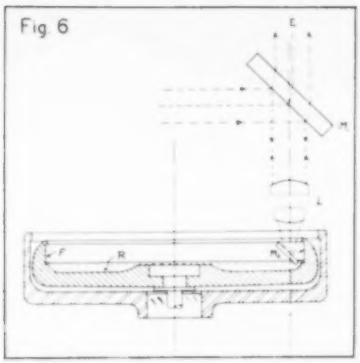


FIG. 6. Cross-section of high speed rotor illustrating method of imaging slit on the moving film.

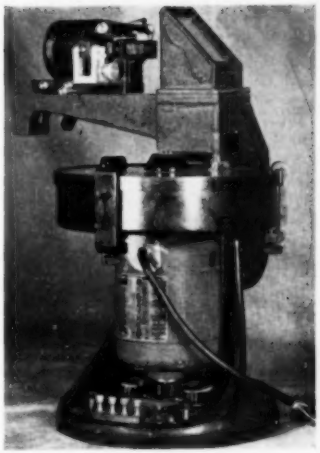


FIG. 7. The complete camera with image dissector in place.

In Figure 6 is shown the manner of handling the negative film which was described some years ago.[2] A shallow drum, open at the top, is mounted on the shaft of a vertical high speed motor. The inner circumference of the drum is machined to accept one turn of 16 millimeter film cut with a gage 24 inches long so that it just fits within the drum with a negligible gap. Light from the image dissector reaches the mirror M_1, is reflected down through the main photographic objective, L, and reflected once more by the lower mirror, M_2, to form the image on the rotating film. At top speed this film is driven past the image at the rate of 400 feet per second. By proper attention to mechanical and optical detail it is possible to resolve approximately 100 lines per millimeter on this film. At a resolution of 80 lines per millimeter with the film traveling 400 feet per second, the individual exposures are of one-ten-millionth second duration, and in effect ten million separate motion picture frames per second are photographed.

The fully assembled camera is shown in Figure 7. The diameter of the rotor case is about 10 inches and the overall height about 18 inches. The present complete camera weighs about 60 pounds, much of this weight being in the cast iron base. The driving motor, rated at 12,000 rpm, is shown immediately below the rotor case. Below the motor, directly connected to its shaft is a miniature inductor type of alternating current generator. The frequency of the alternating current output of this generator is a very accurate measurement of rotor speed, a matter of some importance in certain scientific studies with the camera. The main objective lens, L_5, is in the vertical column above the rotor, and the image dissector appears on the upper arm, the housing being removed to show it more clearly.

When using an image dissector with a single slit, the 24 inch length of film will carry more than 60,000 slit images. Since each complete slit image constitutes a motion picture frame, it is evident that, if necessary, a single scene of more than 60,000 frames duration can be photographed. In using a double slit system giving a 30 element picture, the number of frames which may be photographed without overlap is much reduced. In the present model this is limited to continuous runs of 1600 frames, which is still sufficient for photographing a great variety of events.

Since at a speed of ten million frames per second the exposure time is limited to one-ten-millionth second, the problem of getting sufficient light for proper photographic exposure can be very difficult. If one calculates the illumination required upon ordinary opaque objects of average reflectance, the value turns out to be between twenty and one-hundred million footcandles. To obtain such an illumination upon even one square foot would require several thousand kilowatts of the most efficient light sources such as carbon or mercury arcs, and such power requirements are obviously out of the question except in specially equipped laboratories.

Fortunately modern electrical discharge flash lamps provide an ideal solution because the duration of the high intensity illumination required is quite short. Suppose a scene sequence of two thousand frames is required at ten million frames per second. This means that the illumination must continue for only one-five-thousandth second. Flash lamps of the types described by Edgerton

FIG. 8. The printer arranged for automatic rectification of the streak negative (placed in the precision carriage at left) into a finished 16mm. projection print.

and his associates can easily produce a total flux of 10^9 lumens for times greater than 10^{-4} seconds. For example, a General Electric type FT 524 lamp operated from a condenser of 100 microfarad capacity charged to 4 kilovolts will produce the order of 10^9 lumens for about 2×10^{-4} seconds, an operating discharge which is entirely practical in this lamp. A condenser and power supply weigh only about 75 pounds, providing a practical and at the same time portable light source. A timing mechanism is, of course, necessary to discharge the lamp at the appropriate moment required by the object to be photographed, but in most applications this is comparatively simple. Numerous timing methods have already been described by Edgerton.

After the negative film is processed it is necessary to print it back through a system similar to that of the image dissector, in order to reconstitute the original picture. This is done with a simple automatic printer shown in Figure 8. The negative film is mounted on a micrometer slide which is advanced automatically the required interval by means of a solenoid operated ratchet. The reconstructed image is received on standard 16 millimeter positive film carried in the small motor driven camera provided with a microswitch on the single frame shaft. This switch closes the solenoid circuit momentarily during the pulldown interval of the camera, advancing the negative by any desired amounts from one to twenty frames. Thus, if the original photograph has been made at a higher speed than is required to show the motion, it is only necessary to print every second, fifth, or even every twentieth frame in making the final 16 millimeter film.

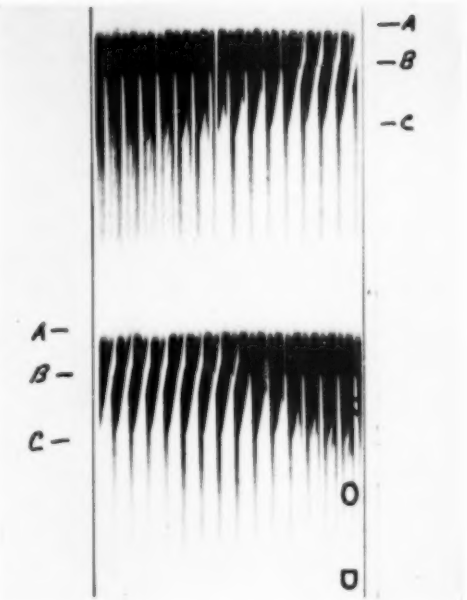


FIG. 11. Negative streak image of rifle bullet breaking glass panel. The bullet is entering the field at A, the fracture wave is commencing at B, and the bullet leaves the field approximately at the position C.

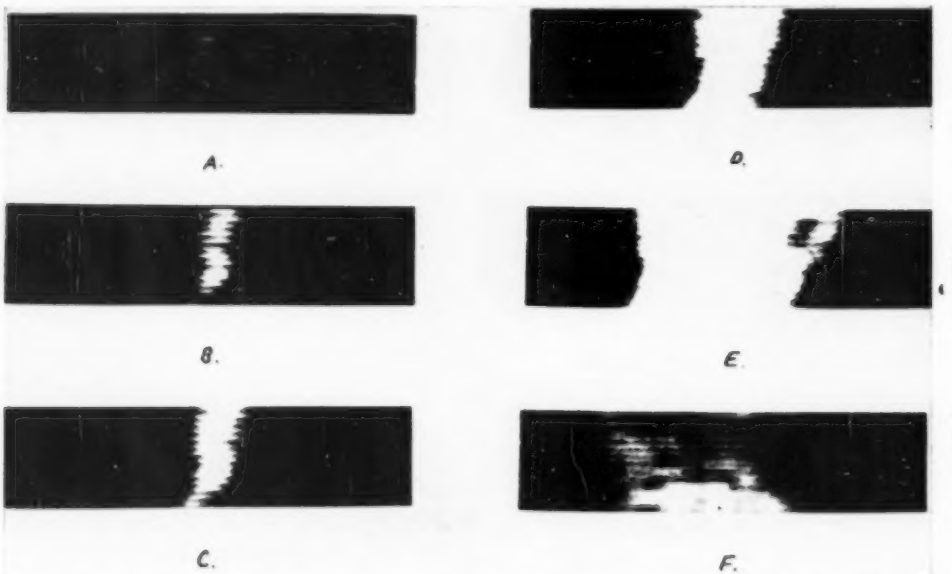


FIG. 9. Reassembled motion picture frames showing .125 microfarad condenser charged to 30 Kilovolts discharged through .003" vertical iron wire. Magnification on print approximately 6X, approximate intervals: A, 0 sec; B, .05 microsec; C, .1 microsec; D, .4 microsec; E, 1 microsec; F, 3 microsec. Note the initial expansion rate of over 10 Km per sec. This expansion rate is actually too fast for proper resolution.

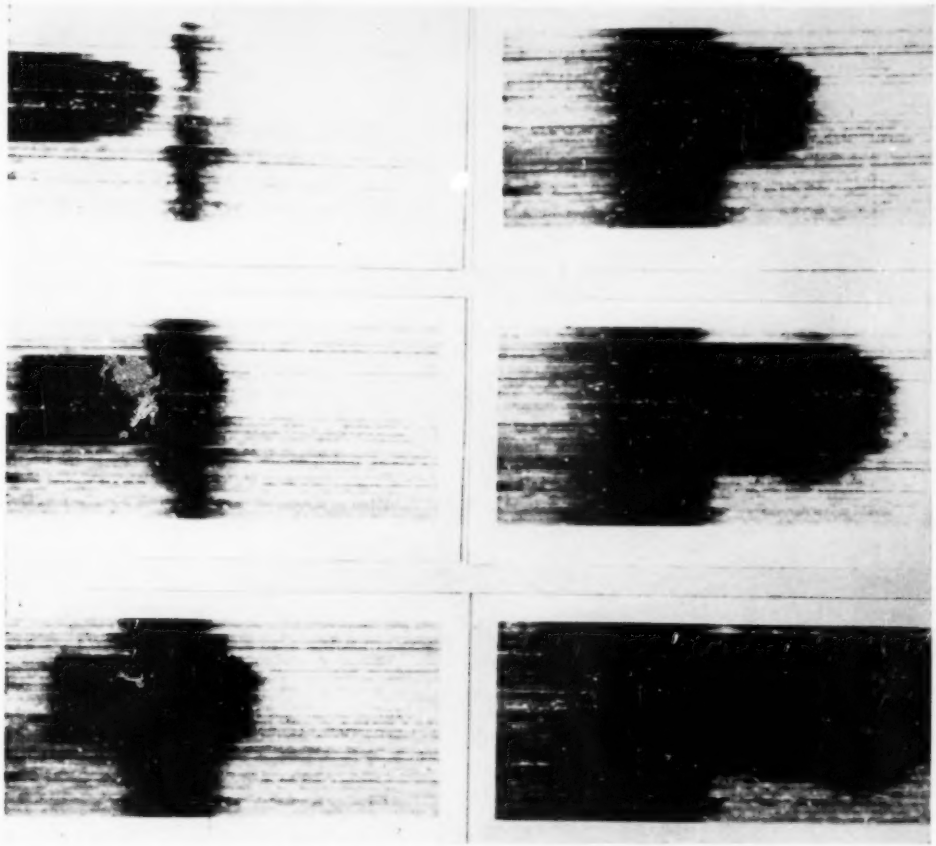


FIG. 10. Reassembled motion picture frames of a .22 caliber rifle bullet passing through 2 mm glass plate. Photographed at 5,000,000 frames per second, prints reproduced at intervals of approximately 40 frames or 8 microseconds. The actual bullet is about ½ inch long. Note as the bullet strikes the plate a fracture wave travels vertically at approximately three times bullet velocity. After the bullet has passed a cloud of glass fragments remain "suspended" in mid-air, the forces acting on these particles now being relatively small.

In Figure 9 is shown a sequence of the explosion of a metallic wire subjected to a heavy condenser discharge. This is a very bright self-luminous event and presents no illumination problem. In Figure 10 is shown a photograph of a rifle bullet initiating a transverse fracture wave in a vertical glass plate. In Figure 11 is shown an enlarged reproduction of the negative from which Figure 10 was made. It will be noted that the upper half of the photographs of Figure 10 have been supplied by the upper portion of Figure 11, while the lower halves of each picture have been provided by the lower half of Figure 11. A single frame of the final motion picture is represented by a very narrow strip extending from left to right all the way across the upper portion of Figure 11, plus a similar narrow strip extending across the lower portion of the figure. With the film speeds used at present this strip on the original negative is only one-eightieth millimeter high with the camera running at ten million frames per second.

The most conspicuous feature of the present result, other than high speed, is the very poor image quality. Although the camera is useful in its present form for the analysis of certain types of fast events, the poor image quality is a very serious practical limitation. This is fully recognized, and this paper is in the nature of a progress report. Another form of the camera giving similar speed but much better image quality is now under construction, and it is hoped that a report upon this may be made at an early date.

References

1. U. S. patents nos. 2,021,162 (1935), 2,061,016 (1936), 2,088,732 (1937), 2,088,626 (1937), 2,089,155 (1937), 2,112,002 (1938), assigned to Scophony Ltd., London.

2. "High Speed Running Film Camera for Photographic Photometry." Phys. Rev. 50, p. 400 (1936).

AFTER THE STORM — R. C. Cartwright

PSA Continental Print Contest

Boston CC took first place in Class A in the PSA Continental Print Contest for October, with 78 points. Runners-up in the A competition were Silhouette CC of Detroit, with 65 points, and California CC of San Francisco, 58 points.

In Class B, Channel City CC of Santa Barbara, Calif., topped the list with 59 points, followed by South Bend CC (Ind.), 48 points, and Jackson Photo. Society (Miss.), 45 points.

The contest was judged at the Kodak CC in Rochester by a jury composed of Jordan Ross, Alfred Hyman, and Eugene Sourla. Fifty-five clubs participated, and 218 prints were entered.

There was a tie for first honors among the prints in Class A, the winners being "Maid of the Rancho" by Cecil B. Atwater, FPSA, of Boston CC, and "Bonnie" by Durward DuPont of Silhouette CC. Second and third places were taken respectively by "After the Storm," by R. C. Cartwright of Boston CC, and "Winter Magic," by Clifford Matteson of Science Museum Photo Club of Buffalo.

The winning print in Class B was "The Broken String," by I. M. Endres of Jackson Photo Society, followed by "Hi-lites," by M. M. Deaderick of Channel City CC, and "Portrait," by Boris Dobro of the same club.

C. B. Atwater, reporting on "Maid of the Rancho," says that the negative was

MAID OF RANCHO — C. B. Atwater

Triple S Pan in a 9 x 12 cm Recomar camera, f/3.8 Schneider Xenar lens. Taken on a rather dull day, the exposure was about one second with a stopped-down lens. He used the paper negative process to alter some of the values and give the print a richer feeling. The final print was made on Opal B developed in glycin. The picture was exposed at the ranch of a Mexican artist-friend of Mr. Atwater's.

"Bonnie," which tied with Mr. Atwater's print for first place, was taken by Durward DuPont in a Medalist II on Plus X film by the light of two #5 flash bulbs at 1/200 and f/16. It was developed in Finex, then printed on Velour Black T#2, developed in 55D, and slightly toned in Nelson's Gold Toner. There was practically no control used in making the print, which was taken from about a 35mm section of the film. Mr. DuPont says that he did this job for a mother who desired a picture of her daughter to be finished in oils—thus the clothing was chosen to put the picture in the mood of the old masters.

R. C. Cartwright reports that "After the Storm" was taken on January 22, 1948, at about 3:30 P.M. The film was Plus X, and exposure was 1/100 second at f/11 with K2 filter. Camera was a Super

BROKEN STRING J. M. Endres

Ikonta B. The print was made on Opal B, developed in D72, and toned in Thiocarbamide Blue Toner.

"Hi-lites," by M. M. Deaderick, of Carpinteria, Calif., was taken while out with a group of students, who had an assignment to cover an industrial plant. A Standard Rolleiflex was used, f/3.5 Tessar lens, Plus X film, developed in Microdol for 16 minutes. It was printed on Velour Black, developed in 53D and toned slightly with Gold-Thiourea, to give a slightly bluish tinge. It has been accepted 14 times out of 16 submissions, in salons.

Mr. J. M. Endres reports that "The Broken String" was made as a demonstration shot, during a lecture given before the Jackson Photo Society, using home lighting equipment. The negative was made with a 5 x 7 B & J View Camera with a 4 x 5 reducing back, using a 300mm Schnieder Tell-Xenar f/5.5 lens, set at f/11, 1/5 sec. Film was Super XX, developed in glycin, and printed on Opal Z.

Club Standings—Class A

	Points
Boston CC, Boston, Mass.	78
Silhouette CC, Detroit, Mich.	65
California CC, San Francisco, Cal.	58
Detroit CC, Detroit, Mich.	53
Science Museum PC, Buffalo, N. Y.	52
Queen City Pictorialists, Cincinnati	49
PS of Pittsburgh Ac. Science & Art	48
Elkhart CC, Elkhart, Ind.	48
Germantown PS, Philadelphia, Pa.	47
Atlanta CC, Atlanta, Ga.	45
Baltimore CC, Baltimore, Md.	44
Western Reserve Picts., Cleveland, Ohio	41
Camera Guild of Cleveland	40
Photo. Guild of Detroit	38
Photo Pictorialists of Milwaukee	37
St. Louis CC, University City, Mo.	35
Photo. Society of San Francisco	33
Grosse Pointe CC, Grosse Pt., Mich.	33
Berkeley CC, Berkeley, Calif.	27

Club Standings—Group B

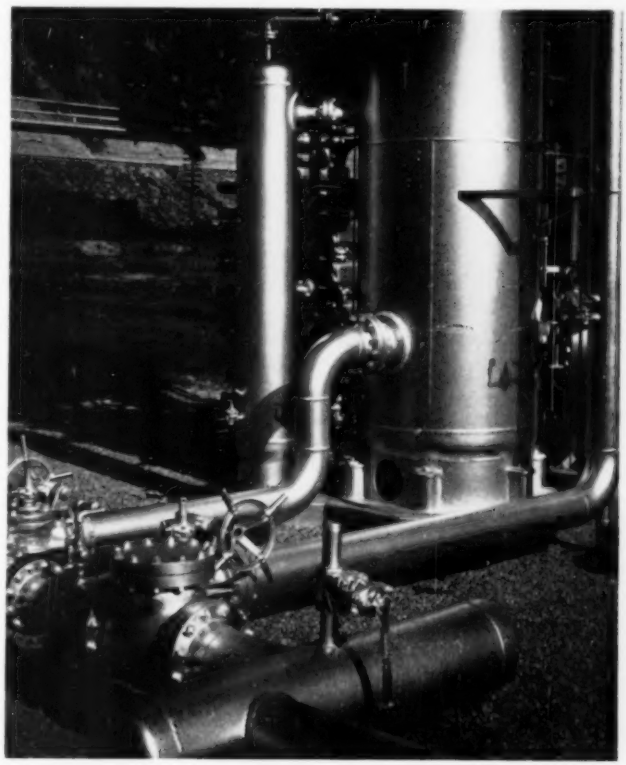
Channel City CC, Santa Barbara, Calif.	50
South Bend CC, South Bend, Ind.	48
Jackson Photo Soc., Jackson, Miss.	45
CC of Cincinnati, Ohio	35
CC of Prov. Eng. Soc., Providence, R. I.	35
Canton CC, Canton, Ohio	34
Rock Island CC, Rock Island, Ill.	34
Sierra CC, Sacramento, Cal.	34
Seven Hills Photographers, Cincinnati	32
Niagara Falls CC, Niagara Falls, N. Y.	32
Lancaster CC, Lancaster, Pa.	31
Owego CC, Johnson City, N. Y.	30
Shotewood CC, Milwaukee, Wis.	29
Camera Crafters of Baltimore, Md.	29
Chambersburg CC, Chambersburg, Pa.	29
Birmingham CC, Birmingham, Ala.	28
Woodland Camera Forum, Woodland, Cal.	28
Beloit CC, Beloit, Wis.	26
Houston CC, Houston, Texas	26
Orleans CC, New Orleans, La.	25
San Luis Obispo CC, San Luis Obispo, Cal.	24
Sanke River Valley CC, Payette, Idaho	22
Palo Verde CC, Blythe, Cal.	21
Edgewater CC, Edgewater, N. J.	20
Ogden CC, Ogden, Utah	20
Stillwater CC, Stillwater, Okla.	19
Taft CC, Taft, Cal.	19
Perfex Photo Club, Milwaukee, Wis.	19
Portland CC, Portland, Me.	19
Sioux Falls CC, Sioux Falls, S. D.	19
Venango CC, Oil City, Pa.	18
Baleo CC, Rochester, N. Y.	16
Comm. CC of Christ Church, Ardmore, Pa.	16
Photos 21 C, Hanford, Cal.	15
Heart of the Ozarks, Springfield, Mo.	15
Utica CC, Utica, N. Y.	9

Your Camera. All the Steps to Good Photography, by W. D. Emanuel. The Focal Press, Inc., 381 4th Ave., New York 16, 240 pages, 5 x 7½, cloth, illustrated, $2.50, 1948.

This photographic guidebook for beginners, incorporating information which advanced photographers also may use, establishes photographer and camera as partners, then charts paths to successful photography in black-and-white and color. The color section is the work of Joseph Snyder.

BONNIE D. Du Pont

The basic material logically and interestingly is presented in a way which invites the photographer to make increasing use of his camera and to essay projects successively more difficult. Diagrams and tables, hints and tips, are of further help in telling the aspiring camera-user how to apply the knowledge he is gaining.—VHS



HI LITES M. M. Deaderick

PALS

Ferd L. Cole

From the FSA 1941 Exhibition

SOLITUDE

Hans Kaden, FPSA

From the PSA 1948 Exhibition

THE RUGGED ARMS OF WINTER

J. H. Sammis

FROM THE SECOND COLUMBUS SALON

FEATHERED FRIENDS

Walter J. Skrainka

WHAT'S NEW

By Jacob Deschin, APSA

They applauded a camera at the PSA convention, and I guess you know the camera I mean. The Polaroid Land one-step, of course. Whether it goes over is anybody's guess, but one thing is sure, as the first public demonstration by Dr. Edwin H. Land, the inventor, proved. The first reaction is favorable and enthusiastic. Personally, I believe it has a great future and may even open up new applications for photography.

By the time you read this, the camera should already have become available, though in limited quantities, and you know better than I do now what the price will be. At this writing, we are told that the Model 95, the first of a series utilizing the Land one-step process, will sell for "well under $100" and the film will cost about $1.50 to $1.75 a roll of eight pictures size 3¼ by 4¼ inches.

The color of the print is a pleasing sepia. Later, film will be made available for prints in a choice of colors from blue-gray to reddish. New-type devices give the camera the operating simplicity of a box camera, at the same time permitting a much wider degree of usefulness.

Handsomely styled by Walter Dorwin Teague, the industrial designer, the Land camera resembles an ordinary folding type camera, measuring 10½ by 4½ by 2½ inches and weighing four pounds, two ounces. The difference lies chiefly in the use of special film having a speed of ASA 100 and consisting of two rolls attached to a paper leader. One roll carries the photosensitive negative material, the other contains the paper, not light sensitive, on which the print will be made. A sealed pod containing a few drops of jellied developer is attached at intervals along the length of the paper, one pod for each picture.

After taking the picture, negative and paper are passed through metal rollers within the camera, thus breaking the pod and causing the developer jelly to spread evenly and thinly (about one-ten-thousandths of an inch) between negative and paper. Development of the negative and the making of the print is simultaneous.

The film works like a conventional film-pack. The spools are dropped into troughs at each end of the camera and the camera back is closed. As each exposure is made, the leader tab is pulled until it stops. After a minute, a door in the back of the camera is opened and the finished semi-matte picture is taken out, complete with white border and even a deckle edge.

Although the timing is not critical, a slightly shorter period than one minute will produce a softer image, a somewhat longer period will result in greater contrast. Temperature changes make little differences over the range of 50° to 110° F. At 45° F. the developing time must be increased to two minutes, at 20° F. to six minutes.

The beginner in photography does not have to learn about f/ stops and shutter speeds when using the Land camera. He simply turns a dial, bearing numbers from 1 to 8, and both shutter speed and lens opening are simultaneously adjusted. He selects the correct number by consulting an exposure guide supplied with the film, or the accessory Polaroid Exposure Meter, made by General Electric, which clips onto the camera and gives direct readings in the numbers 1 to 8. If the resulting print is too light or too dark, the photographer knows it in one minute and can make a correct exposure on the spot. Number 1 is equivalent to f/11, No. 8 to f/45.

The camera has a coated three-element anastigmat lens of 135mm focal length, is focused by scale from 3½ feet to infinity and has a built-in contact for flash photography. The optical eye-level finder has extra large elements, and a front sight consisting of a tight coiled spring with a centering ball at its tip. For closer than eight feet, centering is done by sighting a red collar just below the ball.

Rollei Synchronization

Another item that attracted wide interest during the month is the built-in mechanical synchronization for the Automatic Rolleiflex, Ikoflex III and all models of the Contax camera, announced by A. C. Muller, camera repair expert, of 421 Seventh Avenue, New York City.

The device is operated without external units, all of the mechanism being contained within the camera. Access to this mechanism is by two small connector plug receptacles, into which a standard synchronizer connector cord is inserted, the other end of the cord being plugged into any kind of battery case containing two or three batteries. The plug receptacles appear just below the taking lens on the Rolleiflex, to the left of the viewing lens on the Ikoflex, and at one end of the Contax camera just below the rewind knob.

Simultaneous operation of the shutter and flashing of the lamps is affected by depressing the camera's regular body shutter release. This mechanical release of the shutter has the advantage that since no electricity is drawn from the batteries to operate the shutter, all of the "juice" goes into the lamps. The result is that with this unit it is possible to synchronize as many as three flash lamps at any practicable distance from the camera and at any shutter speed.

Price of the installation on any of the cameras is $40, which includes a standard synchronizing connector cord.

Wrist Camera

From Munich, by way of the United Press, comes word of a small camera that is worn like a wrist watch. It weighs 8-1/16 ounces and takes 400 pictures on a roll of 35mm film. The inventor is a Dr. Rudolf Steinbeck, a Munich scientist, who wants to make photography simple to do. The camera is now in production. No word about price as yet, nor about its availability in the United States.

Dr. Steinbeck says his camera is foolproof, simple to operate and can be used "at a moment's notice" without removing the camera from the wrist. The picture is four millimeters in diameter and may be

psa Data Sheet

FILTERS FOR INDOOR COLOR PHOTOGRAPHY

With these G-E. Bulbs	and this Color Film	Use these Filters * EASTMAN	ANSCO
No. 5, 6, 11, 22, 31, and 50	Kodachrome type A	CC 15	.....
	Kodachrome type B or Ektachrome	Wratten 2A	.....
	Ansco Tungsten type	.....	U V — 16
SM	Kodachrome type A	No Filter	.....
	Kodachrome type B or Ektachrome	No Filter	.....
	Ansco Tungsten type	.....	No Filter
Photoflood No. 1, 2 and 4, RFL-2, RSP-2	Kodachrome type A	No Filter	.....
	Kodachrome type B or Ektachrome	CC 13	.....
	Ansco Tungsten type	.....	U V — 15
3200° K Lamps	Kodachrome type A	CC 4	.....
	Kodachrome type B or Ektachrome	No Filter	.....
	Ansco Tungsten type	.....	No Filter
3350° C.P. Lamps	Kodachrome type A	No Filter	.....

* Or Equivalent

Courtesy G-E Photolamp News

PSA TRADING POST

Open to individual members, free of charge. Limit 25 words each. Copy closes the tenth of the second preceding month before publication.

Wanted—PSA Journal, Volumes I through V, suitable for binding. H. F. Fitzpatrick, 1951 Everest St., Arlington, Calif.

For Sale — Send for list of new and used photography books. *Wanted* — Leica or Contax, also Ciroflex with Rapex shutter. Major Edwin R. Page, Norman, Okla.

For Sale — Contax II, f 2.8, in fect, case and shade, $235. Contameter for Contax II, $85. Both very clean condition. James Biavaschi, 502 Morris Park Ave., Bronx 60, N. Y.

Wanted — Copy of E. J. Wall's "The History of Three-Color Photography," Boston, American Photographic Pub. Co. Please notify as to condition and price. William F. Matthews, Jr., 280 Upper Mountain Ave., Upper Montclair, N. J.

For Sale — 4 x 5 Series D. Graflex, FPA 18 septum mgz. 7½" K.A. lens. $125. Perfect. New Standard Rolleiflex, case, Rolleikin back, flash, Proxars, Bantam adaptor, pan head — like new. $275. Jess R. Baker, 151 South Oregon St., Ontario, Ore.

enlarged to slightly more than 2 by 3 inches. The special fixed-focus f 2.5 lens takes sharp pictures, without further adjustment, from three feet to infinity.

Another camera for the not-too-serious photographer is the Vestkam, a miniature one-half the size of a package of cigarettes, said to be the first camera manufactured in Japan to American specifications and under American supervision. Price is $9.95. Importers are the Baird-Lencheck Corp., 235 Fifth Avenue, New York City. The camera has an f/4.5 lens, shutter speeds to 1/50th of a second. Pictures are the size of a postage stamp.

Berenice Abbott, internationally famous photographer and severest critic of camera designers, has designed and is marketing the Abbott Distorter, the first product of her House of Photography, Inc., 70 East 45th Street, New York City. Initially, the device is on sale at Fotoshop Stores, 18 East 42nd Street and 136 West 34th Street, New York. The Distorter features a goose-neck arm to support a flexible platform which can be bent, twisted and turned into any desired shape to produce distortions for fun or more serious intent.

Now you can *paint* stainless steel, thanks to the Lockrey Company, of College Point, N. Y., who have announced their "Liquid Stainless Steel." The new material, according to the company, is "actually microscopically fine flakes of stainless steel embodied in a chemical-proof colorless liquid plastic." It is water-proof, chemical-proof, fireproof, etc. Apply it with a brush or spray; it dries in a few hours without baking. Price, $2.50 per pint, $3.95 per quart or $12 per gallon.

From the same company comes news of a protective coating called Siliconize, which prevents moisture from making contact with glass surfaces. A four-ounce bottle costs $1. Lenses coated with this solution are protected, according to Lockrey, from deposits of dust and abrasive particles and fingermarks which accumulate on moist surfaces. Siliconize is applied like lens cleaner and polished until dry with soft tissue or linen.

G. O. Walter, of the Republic Camera and Projector Company, 33 Union Square West, New York, has come up with a few ideas to adapt standard equipment for the handicapped. He has started by redesigning a reflex camera to permit operation by physically handicapped persons, such as paraplegics and infantile paralysis victims. The base of a reflex camera is clamped to a wheel chair. This permits the patient to tilt and turn the camera in any direction with minimum effort. The camera can be made to operate by elbow, knee or mouth action, and electronic controls can be used with motors.

A photoelectric exposure meter equipped with a view finder so the user can actually see the area he is measuring, has been introduced by the GM Laboratories, Inc., 4300 North Knox Avenue, Chicago 41. It's the new Skan deluxe model ($19.95). Another feature is the twin scale, one for normal readings, the other for low light readings. Easy to use, one-hand operation, easy to read, compact (2½ by 4⅛ inches), it uses the ASA exposure indexes.

The same company is offering two new Skan blower-cooled projectors, a 200-watt model selling for $34.95 and 100-watt model for $24.95. The first has a five-inch f/3.5 coated three-element projection lens and die-cast construction. The second has a five-inch f/3.5 three-element lens. Both models are for the popular 2-by-2 slides in glass or cardboard mounts.

A series of Vivid Projectors is being offered by the Three Dimension Company, 4555 West Addison Street, Chicago 41. A blower-cooled model for 2 x 2 slides costs $62.50. The 150-watt Model B, costing $39.75, can be converted to the 300-watt Model C ($49.70) by paying the difference of $9.95 when you feel you are ready for the brighter model. For 2¼ by 2¼ slides, another series is available on the same plan. The 150-watt model selling for $59.75 can be converted to the 300-watt model ($69.70), then to the fan-cooled $82.20 500-watt model. All you do is return the original model to the factory, at any time, pay the difference in cost, and get the new, more powerful projector.

Although designed for hand use, the Hugo Meyer Pocket Range Finder can now be attached to rollfilm cameras by using an adapter, which costs fifty cents. The adapters are attached to the camera with screws or fitted into the tripod socket. Adapters are available for the Adox II, Argus II, Kodak Tourist, Vigilant, Monitor, Retina, Ikonta A, and may be fitted into the tripod sockets of 8mm and 16mm movie cameras. Write Hugo Meyer & Co., Inc., 39 West 60th Street, New York.

What appears like the start of a new trend is Kodak's announcement that they are now packaging Kodak Dektol Developer in packet form, in heat-sealed aluminum foil wrappers containing chemicals for 16 ounces of working solution. This volume will process about thirty 5 x 7 prints, or equivalent. The contents of two envelopes, marked "A" and "B" are mixed according to directions. Three such units are packed in a carton selling for thirty-five cents.

Kodak also announces a completely revised edition of the Kodak Data Book, "Kodak Lenses, Shutters and Portra Lenses." Punched for the Kodak Reference Handbook, the book covers fundamental theory and formulas, and includes the latest data on each still-camera lens, plus information and guidance on shutters. Two-color graphs illustrate the section on Kodak supplementary lenses. Thirty-five cents a copy.

For free, Kodak will send you the booklet, "Kodak Chemical Processing Aids," which discusses special chemical preparations such as anti-calcium, anti-fog, anti-foam, etc. Write for your copy to Sales Service Division, Eastman Kodak Company, Rochester 4.

The Larjachrome Process, successor to the Randall Color Process of making enlarged color prints by transferring stretched color transparencies to paper supports, is being marketed by Interstate Distributing Company through the Thirty-fourth Street Camera Exchange, 150 East 34th Street, New York. A $5.95 kit makes 25 color prints.

From Paul Strand's first work with Kodak Ektachrome Film

. . . "This film continues to interest me very much and I think that its response to the subtleties of color in nature is altogether remarkable." PAUL STRAND

Kodak color includes Kodachrome Film for most miniature, home-movie, and sheet-film cameras; Kodacolor Film for most roll-film cameras; Kodak Ektachrome Film for home processing.

"PAUL STRAND is recognized as one of America's major artists. While meticulous detail, texture, tone values, and print quality of the highest order go into the making of a Strand photograph, one is never made conscious of these as special qualities, for they are always completely fused into the unity of his conception."

. . . From a magazine article by Edward Steichen

It's Kodak for Color

Kodak

BULLETINS

NEWS OF KODAK PLANS AND PRODUCTS

Memos For '49—Make a note on your cuff to visit your Kodak dealer and see the new Kodaslide Table Viewer in operation. Take along some of your own miniature Kodachrome shots (in double-glass, cardboard, or mixed slides; the Viewer accepts all with ease). Run them through, and you'll discover viewing convenience and pleasure you never knew before. It's projection from the rear, on that tricky black viewing screen, that makes the difference. $95—and worth it.

. . . And while you're at your dealer's, if you can tear yourself away from the new Viewer, try trimming a print or two on a Kodak Guide-Rite Trimmer. This smart little unit is worth knowing about; it has keen, long-life blades of high-carbon steel, a die-cast body, an embossed easy-to-read measuring scale, and a spring return which brings the shearing blade back into cutting position after each cut. At $5.50, it offers good sound value.

. . . Now that it's too late for Christmas gifts (or is it?), better give a New Year's thought to anybody you overlooked. For camera fans, there are two gifts that always make a hit—a copy of the Kodak Reference Handbook, or a copy of "This Is Photography." The $3.50 Handbook is loaded to the margins with technical and operating data, sure-fire ammunition for camera-club members who like to talk technique as well as take pictures. And "This Is Photography," at $2, serves as teacher, friend, and Indian guide to anybody who wants better pictures. (If your owr library lacks either book, do yourself a good turn for the new year too.)

See your Kodak dealer

KODAK products are sold through Kodak dealers, any of whom will be glad to complete the descriptions of Kodak products which are mentioned in these pages. Usually, too, they will give you opportunity for firsthand inspection of the advertised items.

And in matters of general photographic information your Kodak dealer will be found to be soundly informed.

1949 . . . A decade ago, miniature cameras were the focus of all photographic excitement, and anybody who used a tripod was an old fuddy-duddy. Today, among serious amateurs, there's a growing interest in sheet film and view cameras—and good sturdy tripods. It may be that the classic Cine-Kodak Tripod, long the darling of serious movie makers, will at last come into its own among still-camera enthusiasts. Briefly, the Cine-Kodak Tripod weighs $6\frac{3}{4}$ pounds, adjusts for a camera height from $1\frac{1}{2}$ feet up to 5 feet, panorams 360 degrees horizontally (and vertically from straight up to straight down)—and has supported hundreds of Cine-Kodak Special cameras through thousands of rock-steady movie reels. It's a tripod to know, if you're really serious about sharp pictures with the larger cameras. The price is $60, plus tax.

. . . Any small fry in your family, ready for introduction to the fascinations of photo processing? Best way is to start them out with a darkroom outfit of their own—something in which they can take an owner's pride from the start. The Kodak ABC Photo-Lab Outfit has always been excellent for that purpose; and now that it includes Kodak Velite Paper and the Kodak Tri-Chem Pack, it's even better. Kodak Velite Paper, you may recall, is used in average room illumination—so your son or daughter can learn about print making without squinting under a safelight. Price of the outfit, $6.50, plus tax.

. . . Just because there's interest in large cameras, don't think miniature cameras are on the wane. Kodachrome Film alone would prevent that. You'll note that the back covers of most photo magazines this month are devoted to the Kodak 35 Camera, and to that superb small handful of photographic efficiency, the Kodak Flash Bantam Camera.

Symbol

THE DARKROOM SCENE at left typifies a dramatic new trend in photographic darkroom practice—the packet trend.

Wherever a processing solution is needed in a hurry . . . in moderate quantity . . . accurately measured and daisy-fresh . . . the airtight, heat-sealed metal foil packet has no peer. First sparked by Kodak Universal M-Q Developer packets . . . boomed by the Kodak Tri-Chem Pack . . . the packet parade now includes nine popular Kodak chemical preparations.

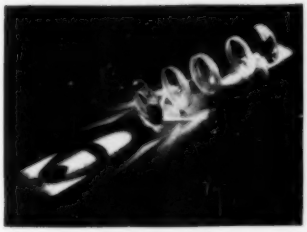
Enthusiasts who have already discovered the convenience and dependability of packets will be happy to hear that Kodak Dektol Developer, that stand-out favorite for fine enlarging, is now available in packets—to mix in a jiffy, use fresh, and then discard, eliminating all storage problems.

The Kodak Tri-Chem Pack is a complete kit of all the chemicals you need to develop two average-size rolls of film or 50 average-size contact prints. Others, all in the same safe, convenient, never-go-stale form, are Kodak Universal Stop Bath, Kodak Blue Toner, Kodak Sepia Toner, Kodak Chromium Intensifier, Kodak Farmer's Reducer, and Kodak Reducer and Stain Remover. Try any one, learn the handiness and reliability of Kodak packet chemicals, and you'll be using them from now on.

Prices subject to change without notice.

"Kodak EKTAR"

not mere identification, but a seal of quality



On this Kodaslide Projector, Master Model, is a Kodak Projection Ektar lens.

TRADITIONALLY, a lens name simply tags an optical formula—so many elements, of a certain type, in a certain order.

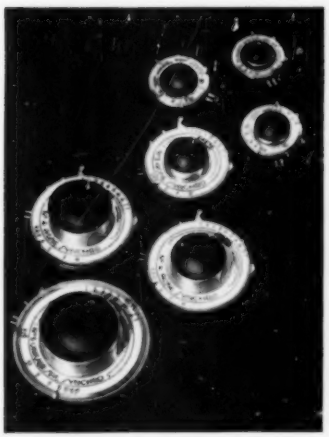
The words "Kodak EKTAR Lens" are different. They constitute a performance index, a seal of quality, a sterling mark. Membership in the Kodak EKTAR family is rigidly restricted, not to a given formula, but to lenses *which yield top performance in their field.*

To win the "Kodak EKTAR" accolade, a lens must qualify as follows:

1. Every optical aberration must be reduced to negligible proportions.
2. Image definition must be sharp and crisp to the very edges of the field.
3. The image must retain critical sharpness over the entire range of distances at which the lens is meant to be used.
4. Color images must be the same size; no color fringing is acceptable.

As applied by Kodak, this list of requirements limits the Kodak EKTAR lens family to the best of modern lens formulas, based on liberal use of modern high-index rare-element optical glasses, with each element ground and polished to extremely fine tolerances, fully Lumenized, assembled in a mount of superb mechanical precision, and subjected to the most rigorous performance tests.

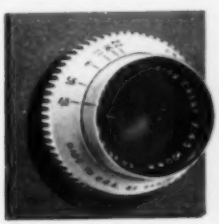
There are Kodak EKTAR lenses for many fields—for press and view cameras, for movie making, for enlarging, for slide projection, for special scientific and industrial use. Whatever type you buy, you may rest content; there will be no better lens for its purpose anywhere.



For press, view, and commercial cameras, Kodak Ektar lenses are available in a wide range of focal lengths, and apertures to f/4.5, some in barrel, others in flash shutters.

These Kodak Cine Ektar lenses furnish the movie maker a logically planned family of focal lengths and image-magnification steps. Definition and color-correction are extremely high; mounts are lightweight and compact.

Kodak Wide Field Ektar lenses cover 75 degrees wide open, still wider fields when stopped down.



Kodak Enlarging Ektar lenses yield crisp definition, clear tone scale; are ideal for color-separation work.

This special Kodak Ektar lens for medical use facilitates x-ray work, records fluorescent screen images.

This special Kodak Ektar lens is for high-detail microfilm recording.

Kodak

A DOUBLE FEATURE—solemn little twins, beautifully photographed . . . baby skin, smooth and "blossomy" . . . wide eyes, shining clear . . . soft mouths, rendered just dark enough. All of this delicate charm caught by those double features of **Kodak Plus-X Film**—speed and fine grain. With this dependable film, Louise Brown Van der Meid could flash at *f*/16 and 1/100 . . . stop the motion of restless hands . . . get plenty of depth . . . secure grainless skin texture and sharp definition.

Try Kodak Plus-X Film for your next flash shots when you want speed and fine grain, plus balanced color sensitivity. Supplied in rolls and packs. . . . At your Kodak dealer's. Eastman Kodak Company, Rochester 4, N. Y.

"KODAK" IS A TRADE-MARK

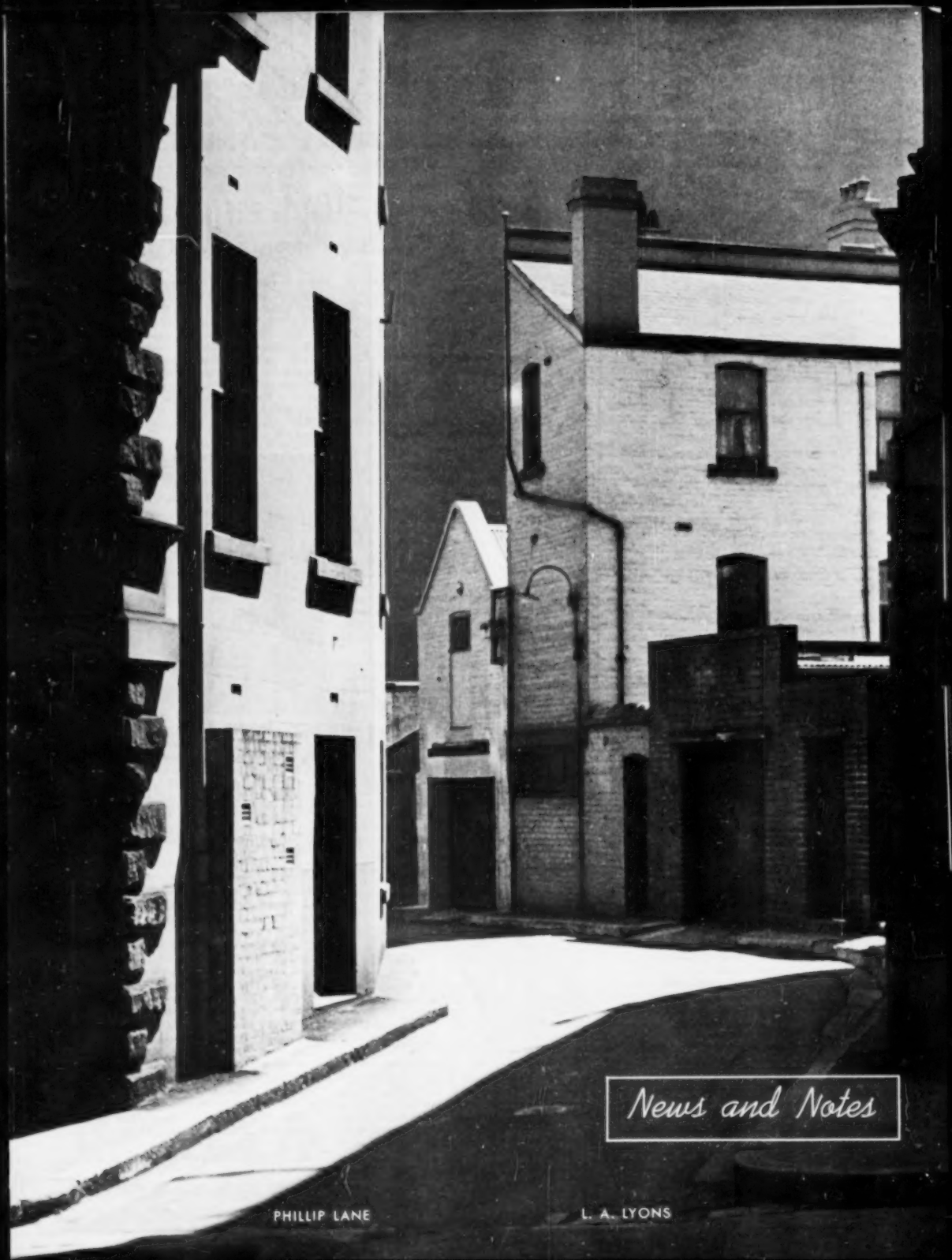
KODAK VERICHROME FILM (rolls, packs)—fast, orthochromatic. For general outdoor use, and for flash photography.

KODAK SUPER PANCHRO-PRESS FILM, SPORTS TYPE (sheets)—Kodak's fastest. For the toughest ones, taken under existing light.

KODAK ORTHO-X FILM (sheets)—a fine, top-speed ortho film. Popular for pictures of men because of pronounced ruddy skin effects.

KODAK SUPER-XX FILM (rolls, packs, sheets)—fast "pan" film for difficult outdoor shots, also Photoflood photography.

Kodak


News and Notes
PHILLIP LANE
L. A. LYONS

THE FOLIO Volume 2, Number 1

Devoted to News of the Pictorial Division and the PSA Portfolios

International Portfolios

There are openings in the following PSA International Portfolios for Pictorial Division members who are interested in interchanging prints for comment and analysis with the leading photographers in foreign countries:

First Egyptian-American
Second South African-American
Fourth India-American
Second Swedish-American
Fourth Canadian-American
Second Australasian American
Second French-American
Third Cuban-American
Anglo-American Medical
First Netherlands-American

For information write to Ray Miess, Director International Portfolios, 1800 North Farwell Avenue, Milwaukee 2, Wisconsin.

Angel De Moya, APSA, and the Club Fotografico de Cuba

That the PSA is so well repreesnted in Cuba is largely due to the drive and enthusiasm of one man, Angel de Moya, of La Habana, Cuba. His photographic biography is so merged with that of the Club Fotografico de Cuba, it would be practically impossible to write a story of the one without the other. In his modesty, Mr. de Moya writes that he appreciates our interest and desire to give him publicity, but that he is working for Cuba and Club Fotografico de Cuba, and wishes we would not "bother about Angel de Moya."

Through Mr. de Moya's efforts, three PSA Cuban-American Portfolios have already been organized, with another in prospect shortly. Beside this activity, he has arranged an exchange exhibit of 30 prints from the Club Fotografico de Cuba, through the PSA International Exhibits activity. The Cuban pictures are now circulating in the United States, while 39 prints from the PSA Chicago Chapter, are in Cuba.

Eighteen new memberships for PSA and Pictorial Division have been sent in from Cuba by Angel de Moya in the last two months. This is a record hard to beat in any man's country

The Club Fotografico de Cuba was founded in May 1939 by a small but enthusiastic group of amateurs. When de Moya was elected president in 1945 the membership was 206. When he went out of office in January 1948, the Club numbered 465 members. At present date, this has increased to 488.

The Club recently staged its first International Salon, which was a huge success, with 31 countries represented, 1,379 prints received, and 396 successful prints hung.

Its quarters are its own, with an exhibition room capable of hanging 380 pictures on 16 x 20 mounts, two darkrooms each fully equipped with precision enlargers, sets of lenses, developing tanks, etc. It has lockers for use of its members, one large portrait studio with ample lighting equipment, a library with about 150 books on photography (mostly in English) and most of the photographic magazines since 1934, bound by years.

ANGEL de MOYA, APSA
Hon. PSA Representative to Cuba, Pictorial Division Representative to Cuba, General Secretary, PSA Cuban-American Portfolios

Report from Sweden

BY KEN LINDENBERG
General Secretary
PSA Swedish-American Portfolios

Today's report from Sweden comes from . . . Denmark! The Second International Exhibition of Pictorial Photography in Denmark has just been held in Copenhagen, and it was in many ways a great success. Out of over 1500 prints submitted, 352 were accepted and hung. To go on record immediately: the U. S. A. and Hungarian collections were by far the most interesting.

Proceeding in the same order in which the prints were listed, I will begin by telling about the collection from India. There were not many Indian exhibitors, but those who were represented, among them Kanti Patel who, I believe, is quite well known in America, proved to be of very high standard.

The next collection, the Italian prints, showed quite an amount of retouching and soft focusing. The Norwegians had some fine examples of portraiture and some really high class prints of commercial work by Ernst Schwitters, ARPS. Other countries represented were: Luxemburg, Spain, Holland, Argentina, Austria, Portugal, Canada, Czechoslovakia, England, Scotland, Finland, Belgium, Denmark, Sweden, United States, Hungary and Brazil.

The Brazilians had quite a large collection representing a very clear style with a clean approach to subject matter, and almost no manipulation like solarization, etc. The English pictures were mainly soft and pleasant motifs in the traditional British pictorialism.

The most valuable contribution to the exhibition of Danish photography was by Mrs. Herdis Jacobsen, famous Copenhagen photographer who runs a studio with her

husband, another very successful 'lensman'. Mrs. Jacobsen exhibited three portraits in low key representing a rather unusual style and taken with a single 2000 watt bulb. In this way she has something in common with the Swedish photographer, Jan de Meyer, who also uses but one lamp. Otherwise he is not much like Herdis Jacobsen, as his famous pictures, some of which were seen at the exhibition, are usually in high key.

The most interesting prints in the Swedish collection were Rolf Winquist's nudes. One might say that Winquist at the moment is Europe's most successful photographer of women and nudes. It might be that his pictures could be criticized as not being true portraits, but they are something that one can call photographic poetry. With the exception of this one point, the Hugarian contributors had a very clear superiority over their European colleagues. Hungarian pictorialism, however, is so well known in the U. S. A. that I do not think it necessary to talk about that here.

Finally, I will mention the U. S. A. prints. Although many of the pictures are old acquaintances to every interested student of American photography, there was general agreement among the visitors that the U. S. A. collection as a whole was definitely the most interesting one in the exhibition. It is a startling fact that the American approach to pictorialism, although to a large extent introduced 'over there' by immigrated former European photographers, still seems to be a new and astonishing thing to the European public. The American way of seeing things through the 'eye' of the camera always attracts European onlookers; even though some of them maintain that they do not like it, they cannot deny that American pictures stop them anyway.

Did You Know That . . .

By FRANCES S. ROBSON, APSA

- - - A new member of the portfolios has broken into print? Mrs. Viva McDonald, member of the First South African-American Portfolio and Vice-President of the California CC of San Francisco, had a letter and two prints reproduced in the November issue of "The Camera" magazine. One print was one of C. S. Loeber's illustrations for his recent "Camerette" on how to make salon prints, entitled "Shadows Three." The other was "Kidding the Judge," and was a comic representation of the same theme, using three pairs of scissors and other props, all from her sewing basket. Mrs. McDonald is famous in her own club for the humor of her prints. Humor in photography is so seldom attained, it is worth special notice when it does appear.

- - - It would further the interests of the PSA International Portfolios if other clubs would do as the Sierra Club of Sacramento, California, did in the August edition of its bulletin? Nearly two columns were devoted to the Portfolio activity, and at the end is a note by the Club President, De Witt Bishop, urging club members to join a portfolio and broaden their photographic interests by becoming acquainted with photographers from other lands.

- - - Mrs. Andre Robinson, General Secretary of the French-American Portfolios, is also a member of the French Photographic Society? In its bulletin of recent date, she learned that Pierre Auradon, of Paris, who is a member of the First French-American Portfolio, took part in a public debate with four other members of "Le Societe' Francaise de Photographie a Paris." The subject was "Art in Portraiture." Mr. Auradon will be remembered by those who saw the French-American Portfolio as the maker of the exquisite print entitled, "Monnaie du Pape."

- - - Many PSA International Portfolio members are taking an active part in photo-activities here at home? Former Director, and General Secretary of the Anglo-American Portfolios, Burton D. Holley, has taken on the biggest job of all, that of Chairman of the PSA Pictorial Division. Another member, Morrill P. Mims, of the 3rd Anglo-American Portfolio, has been elected president of the Boston CC.

- - - American Portfolioists represented in the 93rd Annual Exhibition of the Royal Photographic Society of Great Britain are: Lewis T. Reed, Elbridge G. Newhall, David J. Stanley, APSA, Betty Parker Henderson, Leon C. Forgie and Anne Pilger Dewey, APSA? English members of the Anglo-American Portfolios represented in the Exhibition are Cecil J. Blay, APSA, FRPS, Mrs. Katherine M. Parsons, FRPS, Anthony Peacock, FRPS, G. Crosby, FRPS, T. H. Breakell, FRPS, and John Bell, ARPS.

- - - Anglo-American Portfolios have had to make some changes in personnel recently? Ralph A. Ross, of St. Louis, Missouri, has been appointed Secretary of the Third Anglo-American Portfolio, replacing Harry Langer who resigned because of the increased pressure of his business.

- - - Also, because of business, Reg. Wilsher, ARPS, of Chesterfield, England, has found it necessary to resign as British Secretary of the Second Circle? However, Reg. will remain as a member. Wilfred Barber, ARPS, of London, England, will be the new Secretary.

- - - Fred J. Schmidt of San Antonio, Texas, is busy learning the duties of Portfolio Secretary these days in preparation for assuming the Secretaryship of the Sixth Anglo-American Portfolio? Dr. W. Warren Roepke of Owatonna, Minnesota, the present Secretary, has asked to be relieved because of increased duties and responsibilities in his Masonic Lodge.

- - - First Anglo-American Portfolio has a new member? Dr. Constantine Oden of Muskegon, Michigan, was signed up at the PSA Convention in Cincinnati.

Sorry!! In the September, 1948, issue of THE FOLIO, Dr. Peter Hansell, FRPS, of London, England, was incorrectly described as the Chairman of the R.P.S. Medical Group, in the announcement of the First Anglo-American Medical Portfolio. Dr. Hansell writes to Burton Holley: "I notice with interest on page 479 of the current PSA JOURNAL an announcement concerning the medical folio, but I must ask you to get them to correct certain statements, for though I haven't the slightest objections, it might cause offense to some. The truth of the matter is that I am *not* Chairman of the Medical Group, though I am a Council Member of the R.P.S. Also my tour of medical photographic departments in the States was under the auspices of the Nuffield Provincial Hospitals Trust and not the American Medical Assn."

The PSA International Portfolios announce the revival of the Netherlands-American Portfolios. Dr. L. L. Handly, APSA, 716 West Alabama Street, Houston 6, Texas, is the American General Secretary, and any Pictorial Division member desiring to join should write to Dr. Handly at once, since the Netherlands prints are ready to be shipped to this country.

THE LITTLE MAN

Richard Parkin, ARPS, of the 4th Anglo-American Portfolio, writes that there is a new photographic journal in Britain, "The Little Man." It is produced quarterly, and is the result of merging two postal groups into one, commonly referred to as the UPP. (United Photographic Portfolios of Great Britain.)

"The Little Man" publishes articles, general news items, news of rallies, announcements of competitions, reproductions of prints of circle members, and among other items, this little poem. (There have been times when we have all felt as did the writer.)

The Exhibition
By G. A. TOOTELL, *Circle 21.*

The Judges have selected prints
In black and white, or sepia tints.
They weigh each portrait, study, scene,
And talk of thirds and golden mean.
Then after hours of argument
To entrants catalogues are sent.
The Judges have approved the few.
The Exhibition's now on view.
The people wander through the halls
And gaze in doubt upon the walls
Where hung aloft in serried ranks
Is work beloved by the cranks.
"Commended highly," why? none knows.
Is written large beneath some rows.
And folk decide upon one fact—
"The Judges must be slightly cracked."

Two excerpts from "The Little Man" may be of especial interest to our readers:

"We have received copies of THE FOLIO, which is the official magazine of the PSA International Portfolios, and congratulate the Editor on the way he has infused a personal note into this journal in addition to recording items of general interest. We were interested in the item titled "Backgrounds of members" which included a small write-up on three of our own members, Messrs. E. E. Evans, G. E. Gaisford and R. Wilsher. (All three are members of the Second Anglo-American Portfolio.)

"Anglo-Australian Circle. Circle No. 28. Secretary E. E. Evans announced the further exchanges of letters between himself and Mr. Pocock in Australia had resulted in the setting up of an exchange portfolio of 12 members each side, with one print per member. The first portfolios would be issued from Australia and England on July 21st, 1948."

(The Director, PSA International Portfolios, has also had correspondence with Mr. Pocock, General Secretary of the Australian Portfolio Photographic Society of Mount Gambier, Australia, concerning the organization of an Australian-New Zealand-South African-English-American Portfolio, with each set of portfolio prints making the circuit in all these countries.)

PSA International Exhibits

Club Photografico de Cuba And PSA Chicago Chapter

A set of 30 prints has been received from the Club Fotografico de Cuba for exhibition in the United States for a period of six months, after which time it will be replaced by a new group. The show is here in exchange for a set of 30 prints sent to Havana from the Chicago PSA Chapter.

The Club Fotografico de Cuba was founded in May 1939 by a small, but enthusiastic number of amateurs. At present it has 488 members who pay an annual fee of $12.00 for residents of Havana and $6.00 for those living outside the city. Women pay $6.00 per year.

The club program includes a movie show once a month, and monthly contests of pictorial photographs; sometimes for beginners, sometimes for women only, and other times for advanced workers. Contests are also held for movies and slides.

The club is, at present, working to establish photographic clubs in other parts of the country. There are now clubs in Santiago de Cuba, Camaguey, and Cienfuegos, and the Club Fotografico de Cuba will see that they have an opportunity to view the Chicago Chapter prints.

Danske Kamera Pictorialister of Denmark And The Photo Pictorialists of Milwaukee

On September 16th a set of 25 prints, made by members of the Photo Pictorialists of Milwaukee, was forwarded to Denmark, to the Danske Kamera-Pictorialister. This is a society which is acting as a central organization of Danish photographic clubs. The Milwaukee prints will be put into circulation among 50 Danish clubs, 37 of which, including the Copenhagen CC, are members of the central organization. After that, they will probably go to Sweden, Norway, and Finland.

The Danish prints were shipped to the U. S. in September. The show consists of about 30 pictures, fairly representative of Danish photography. They were picked from an annual exhibition of pictorial photography, consisting of 100 pictures selected from about 500 entries. Quite a few of the pictures are by members of the Copenhagen CC, whose rules of admission are strict, and whose members are nearly all international exhibitors.

After the Photo Pictorialists have viewed the Danish show, and it has completed a circuit of Wisconsin camera clubs, it will be available to other PSA clubs.

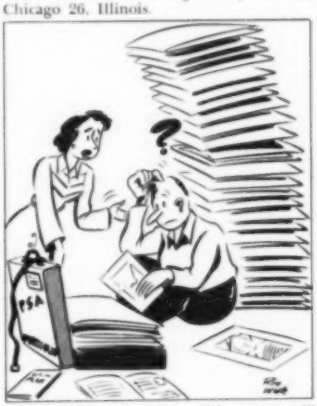
Finnish Camera Club Association and Camera Club Council of St. Louis, Mo.

A set of 35 prints made by members of the CC Council of St. Louis was sent to Helsinki, Finland, on July 9th. We now have word that the pictures arrived safely and will be viewed by the Finnish CC Association's most important club, Kameraseura, at its first meeting of the season. By the end of January, or middle of February, the prints will have circulated in all the 15 Finnish clubs and will be sent to Denmark for circulation there.

The Finnish exhibition consists of 32 prints by members of clubs belonging to their Association. The show is very unusual in many respects, differing greatly from the type of work we do here. The Council of St. Louis says: "The Finnish prints are very fine; much better than the average foreign show we've seen. They were well received by a critical audience. We are more than pleased with the exchange." The prints will be viewed by 22 clubs belonging to the St. Louis Council, after which they will be available to other PSA clubs who wish to see them.

* * *

Would your club like to join in this PSA International Exhibits activity and have the opportunity to view prints made all over the world? For information write to William V. Sminkey, Director, PSA International Exhibits, 1626 Juneway Terrace, Chicago 26, Illinois.



"Christhilf gets it all in . . . Why can't you?"

News of the Pictorial Division

PICTORIAL DIVISION COMMITTEES

Pictorial Division

Chairman, Burton D. Holley, APSA; *Vice Chairman*, William V. Sminkey; *Secretary-Treasurer*, Ray Miess.

The Folio

Editor, Sewell P. Wright; *Associate Editors*, Frances S. Robson, APSA, Dr. C. F. Cochran, Lewis T. Reed, William V. Sminkey.

PSA International Portfolios

Director, Ray Miess. *General Secretaries*; ANGLO-AMERICAN; Burton D. Holley, APSA, Cecil J. Blay, FRPS, FRSA, APSA. AUSTRALASIAN-AMERICAN; Edith M. Royky, Harold A. Larsen. CANADIAN-AMERICAN; Rennie I. Weber, Edward C. Walsh. CUBAN-AMERICAN; Sam J. Rawley, Angel de Moya. EGYPTIAN-AMERICAN; Alfred Watson, APSA, ARPS, V. R. Bousso, FEPS. FRENCH-AMERICAN Andree Robinson, Gilles Boinet. INDIA-AMERICAN; O. B. Turbyfill, D. C. Engineer, APSA, ARPS. NETHERLANDS-AMERICAN; Dr. L. L. Handly, APSA, J. Akkerman. SOUTH AFRICAN-AMERICAN; Frances S. Robson, APSA, Nat Cowan, APSA, FRPS. SWEDISH-AMERICAN; Ragnar Hedenvall, K. Lindenberg. MEDICAL; Leo C. Massopust.

PSA American Portfolios

Director, Eldridge R. Christhilf, APSA, Hon. PSA. *General Secretaries*: CERAMIC Rolland R. Roup. CONTROL-PROCESS; H. D. Ohm, APSA. PHOTO-JOURNALISM; Cliff Edom, APSA. PICTORIAL; Doris M. Weber. PORTRAIT; Gerda Peterich. NATURE; Lee Jenkins.

PSA International Exhibits

Director, William V. Sminkey. *Assistant Director*, Sylvia D. Sminkey. *Committee*; Jane Shaffer (Camera Club Council of St. Louis), Doris M. Weber (Cleveland, Ohio), M. M. Deaderick (Southern California Council of Camera Clubs), Mildred Hatry (Metropolitan Camera Club Council), Wallace J. Stevens (Central Ohio Camera Club Council), Claxton Searle (Bay Area Council of Camera Clubs), George L. Kinkade, APSA, (Washington Council of Camera Clubs), John H. Vondell, FPSA, (New England Council of Camera Clubs), Walter J. Pietschmann (Greater Detroit Camera Club Council).

Portfolio Camera Clubs

Director, Dr. W. Warren Roepke. *Committee*; Sten T. Anderson, Frank P. Meadows, Dorothy M. Cashman, U. Stephen Johnson, APSA, James D. Bobb, Jr., Carlton W. Lingwall. *Honorary Committee Members*; Burton D. Holley, APSA, Eldridge R. Christhilf, APSA, Hon. PSA. *Camera Clubs*; Owatonna Camera Club, Lincoln Portfolio Camera Club, Rochester Portfolio Camera Club, Austin Portfolio Camera Club. *Sponsors*; Anne Pilger Dewey, APSA, Robert L. McFerran, APSA, J. Philip Wahlman, APSA, Doris M. Weber.

Publicity

Director, Lewis T. Reed. *Committee*; Betty Henderson, Gladys Bauer, Monte Kople.

Spee Speaking . . .

The PSA Convention in Cincinnati will be stale stuff to you when you read this, but it's very, very fresh in my mind as I write this, less than a week after the Big Show.

Three of "my" commentators were there; maybe the commentator of my fourth 'folio was present likewise, and if so, I'm sorry I didn't have the pleasure of meeting him, and thanking him for his good work.

But I *did* see amazingly vital, ever-smiling Anne Dewey; that keen and generous critic, Frank Fenner, Jr., and that saturnine wit and good fellow, Hugh Montgomery, who is not topped by any commentator with whom I have had portfolio dealings.

I met several members of my four portfolio circles, too, and it was a real thrill to meet and talk to people who had, up until that moment, been names only.

Another real thrill for me was seeing our own THE FOLIO Associate Editor, Frances S. Robson, march up to the speakers' table for her APSA. (Didn't have the opportunity to congratulate you, Frances, but I certainly was proud!)

Biggest thrill of all, though, was seeing genial, hard-working Eldridge Christhilf (if you read THE FOLIO, you know Eldie, and his work!) receive both the Peabody Award *and* his Hon. PSA. The really grand thing about it was that everyone else in the room was almost as happy as Eldie and Mildred.

Next year we go to St. Louis. We'll have fun there; I know the St. Louis crowd (after all, St. Louis is less than a hundred miles from Springfield, Illinois, where I live) and I know we couldn't have more thoughtful, more generous, more hospitable hosts. Let's start planning *now* to meet in St. Louis in October!

As the new Editor of THE FOLIO, I'd like to repeat a request I made often as an Associate Editor: please help me make this little publication-within-a-publication the most interesting section of our JOURNAL. Your comments, your suggestions, your criticisms, will be exceedingly welcome. The address is: Sewell Peaslee ("Spee") Wright, Linden Lane, Route 3, Springfield, Illinois.

Handle With Care

Photographs are fairly durable when handled with reasonable care, but there have been several instances recently where prints in the portfolios have been damaged by careless handling. One commentator's print, which started the rounds as a thing of flawless beauty, wound up looking like an old relic rescued from a busy alley. The critic was even called to task by some of the members for including so bad a print in the portfolio. On the next round the commentator omitted his print.

There have been other examples of thoughtlessness on the part of members in handling prints. There have not been many, but enough to cause comment.

So watch it, friends! Even though *you* may not think much of it, that print may be someone's pride and joy.

PSA Portfolio Medal Award

This article should be entitled "Cashman's Folly Pays Off" for it is the story of a project known as Cashman's Folly to all the members of the Capitol City CC of Springfield, Illinois. Thus we introduce another winner of the coveted PSA Portfolio Medal Award, George L. Cashman, of Springfield, Illinois. A picture of Mr. Cashman and a reproduction of his winning print, "Pioneer Transport," are reproduced herewith. The print was accepted and hung in the Springfield (Ill.) International held in conjunction with the Illinois State Fair. The judges were Robert L. McFerran, APSA, Anne Pilger Dewey, APSA, and Harry Shigeta, FPSA.

The shot was made in New Salem, Illinois, in May 1948, on Ansco Isopan film, one-one-hundredth at f-16, on a very bright sunny day with no clouds in the sky. The ox team intrigued George Cashman for a long time and he ran the driver practically insane by having him move them from one cabin to another, but, unfortunately, owing to the location of the various cabins, it was almost impossible to get the shot without a lot of shadow from the trees.

The oxen, Pete and Repeat, have been very patient with Mr. Cashman, so much so, that whenever he appeared on the scene they immediately began to look very photogenic. If there were long periods of time when George did not visit New Salem, I understand that the driver had a hard job to prevent the oxen from going down into Springfield and looking up George. We are sure that they must be very flattered to know that, at last, they have been hung in an international salon.

Portfolio Medal Award Winner
George L. Cashman
Springfield, Illinois

The members of the Capitol City CC have borne with George Cashman as he submitted many and varied prints of this ox cart to them. It reached a point where this shot is known by all members of the club as "Cashman's Folly." It will go down in the annals of the camera club as such.

All of which puts George on the spot, for now he must hunt up something new!

Pioneer Transport —*George L. Cashman*

Progress and Medals

We are all aware of the oft-repeated fact that a portfolio can mean a great many things to a great many people. Almost without exception a member of a portfolio will profit from his association with other print makers in the notebooks and the comment sheets. Members range from the seasoned professional to the rank beginner whose first entry may be his first serious print. The stories of progress and profit vary almost as much as the character of the membership varies.

A beginner is finally convinced that no great harm will come to him if he engages in that strange and mysterious activity known as salon competition, and he timidly sends off those four sparkling gems of deathless beauty. Soon he finds out one of two things. Either the judges agree with him, and hang one or more right up there with the prints of all those famous people, or the jury was incompetent and didn't know a good picture when they saw it. The most important thing he learns from that first experience is that the worst thing that could possibly happen to him is that the postcard will say "None, sorry."

Two recent international salons illustrate dramatically the possible effects of portfolio training. Great Falls, Montana, is the stopping place of several portfolios and for their salon this year each member of a portfolio saw to it that each other member received an entry blank. The result was heavy submission by portfolio members and a further result was that four portfolio prints by first time exhibitors were hung and four Portfolio Medals were awarded.

In the Illinois State Fair International this year there was heavy submission from the Capitol City CC, the sponsoring club. Many of the members of this club are members of two or more portfolios. As a result four more first time exhibitors hung portfolio prints and four more medals were claimed.

It is a safe assumption that in these eight instances the portfolio movement can be credited with at least an assist. Knowledge gained through participation in portfolios brought these eight to the point where their work gained them recognition in salon competition. In other salons, medals are being won at a rate which suggests that a whole new generation of exhibitors is coming up through the portfolios.

Remember that if your first acceptance in a recognized salon is a print which has traveled in a portfolio, you, too, may have a medal!!

Special Interest Portfolios

The portfolio idea started off simply enough. Fifteen persons were chosen for no other reason than their common interest in photography, and the fact that their geographical location is fitted logically into a circuit. It soon became apparent, however, that a further bond of common interest was desirable in some instances.

As it stands today we have, in addition to the regular Pictorial Portfolios, more specialized groups such as the Portrait, the Control-Process, the Nature, and the Star-Exhibitor Portfolios. Other groups are being organized, such as Photo-Journalism and Color Print.

Recently, Mr. Donald P. Falconer, of Chicago, became Editor of a page called "The Ceramic Camera Club," which appears monthly in the Bulletin of the American Ceramic Society. In the August issue the entire page was dedicated to the Ceramic Portfolio which is being organized by Mr. Rolland R. Roup, of Milwaukee. The efforts of Mr. Falconer and Mr. Roup should result in a very interesting new portfolio.

It is quite likely that there are many special interest groups that could profit by membership in a portfolio based on that special interest. Almost any hobby or specialization can be photographed or represented pictorially. There are some very nice pictorial shots to be had from ham radio activities, sailing, and mountain climbing, to select three subjects at random. What Falconer and Roup are doing might open up quite an avenue of activity and add a needed degree of variety to pictorial photography—to say nothing of adding new members to PSA, the Pictorial Division, and the portfolios.

Perhaps a good start for the New Year would be for you to start the organization of a new type portfolio.

Portfolio Express Charges

A great deal of confusion has been caused in the past by members receiving a portfolio with express charges prepaid and then shipping it out with the charges collect. This has caused the writing of numerous letters and adjustments along the line to get the matter finally straightened out. Some of this confusion has been caused by the express company. In some cases portfolios have been shipped out prepaid and when they reached their destination, the charges were collect inasmuch as the prepaid ticket had become detached from the portfolio case.

To avoid all this, early in September all new circles being set up were shipped by express collect. Likewise, all new circuits of established circles, since that time, are being changed over to express collect. This will entirely eliminate the confusion that has existed at some points and will also speed up the portfolios. So, if your portfolio reaches you with the charges collect, look in the notebook and you will find a notice of the changeover. Also the Advice of Transmittal Cards will call for shipment by express collect. Do not do as one member did when the portfolio arrived with the charges collect. He refused the shipment and it lay in the express office of his town until word could be gotten back to him, thus delaying the portfolio about a week. So, if the portfolio of which you are a member comes in collect, you will, in turn, ship it out collect and everyone will be happy.

PSA PICTORIAL PORTFOLIO 55

A. W. Goos, Marquette, *Michigan*
Vern M. Judd, Austin, *Minnesota*
Hubert E. Curtis, Dubuque, *Iowa*
Stanley D. Sohl, Lincoln, *Nebraska*
James L. Begg, Jr., Kansas City, *Kansas*
Melvin D. Bundy, Springfield, *Illinois*
D. E. Woolever, Harvey, *Illinois*
Clifford G. Beat, Beloit, *Wisconsin*
T. Milton Kempf, Jackson, *Michigan*
Frank M. Sajovec, Cleveland, *Ohio*
Dr. William F. Bushart, Newburgh, *N. Y.*
Mrs. Ira L. Goding, Arlington, *Mass.*
Charles F. Taylor, Startford, *Connecticut*
Keig E. Garvin, Arlington, *Virginia*
Harry G. Balthasar, Cincinnati, *Ohio*

Camera Clubs

By H. J. JOHNSON, APSA
1614 West Adams, Chicago 12, Ill.

The Judges' List, formerly maintained by the Pictorial Division, has been discontinued by that organization on the basis that the list was not used sufficiently to justify the effort in compiling it.

No such list will be prepared by the Camera Clubs Committee because we consider the method used in the Color Division and the Nature Division to be much more practical and efficient. These Divisions prepare no list, but upon request will recommend judges for contests or for national exhibitions, tailoring the recommendations to fit the circumstances in each case. This service is not only valuable to clubs, but also to individual members of these divisions when their clubs assign them to manage a competition or exhibition.

Starting A Camera Club

The usual advice to the would-be camera club organizer is to make an announcement of intentions, then hold an "organizing" meeting.

We recommend directly the opposite: organize first, and then make a public announcement if necessary. The first stage of camera club growth should be slow in order to build a cohesive unit which can cooperate smoothly. In this way, "flash" enthusiasm, conflicting personalities, cross-purpose policies, etc., can be avoided and ultimately the club will be larger and accomplish more for its members than the club which starts with a publicity splurge.

You need only one other besides yourself to start a club. With him, discuss the problems involved, and if your enthusiasm holds up, find a third interested photographer. Now you almost have a club, with one of you as president, one vice-president, and one as secretary-treasurer. You need three more members at this stage and they should be personally selected if possible. If not possible, because you are not directly acquainted with additional prospects, pass the word around in other groups to which you belong (church groups, social clubs.)

When you obtain your next three members and number six, you can start looking for a meeting place. In small towns where the membership is not likely to become large, the meetings may be rotated among members' homes. Or in larger towns you can find a restaurant where you will be permitted the use of a small room in consideration for dining there.

Select your name (avoiding long or affected names) and establish token membership dues (these dues are to be doubled or tripled as the club grows).

Gaspe Pictures

A set of pictorial prints of the Gaspe Penninsula is being assembled by the Camera Club Committee for distribution to camera clubs as a Print Loan Service. Those willing to donate such prints are invited to send them to:

John G. Mulder, APSA
7 Lake Crescent Drive
East Rochester, N. Y.

We've said nothing about a constitution because we believe you will be much better off without one.

Now you are ready to take in six more members. These, too, should be carefully selected. With these you have a club! Hold an election (which usually will confirm you in your acting office) and plan your programs for six months in advance, meeting once each month (increase frequency later, if necessary).

Now make your public announcement if you wish!

Color Division

By GEORGE W. BLAHA
6240 S. Artesian, Chicago 29, Ill.

For the third consecutive year, Louis M. Condax, APSA, of Rochester, New York, has won the Maxwell trophy which is awarded to the best color print entered in the Annual PSA Color Exhibit.

Convention Comments

Those persons who were fortunate enough to attend the 1948 PSA Convention found a wealth of interesting and informative material throughout the entire program schedule. One glance at the program revealed that, if the Convention had a theme, it was "color."

Demonstrations and lectures were presented by outstanding lecturers: "Supplementary Flash for Color Film Exposure Outdoors" by Don J. Mohler; "Use of Exposure Meter in Determining Exposure for Color Lighting" and "Use of Electric Densitometer" by George Espy; "Color Film—the Photographer's Tool" by Howard C. Colton; "Use of Filters with Color Film" by John G. Mulder; "Masking for Color" by Robert Speck; "National Color Exhibitions and their Problems" by H. J. Johnson; and "Approach to Travel Color Photography" by A. C. Shelton.

One of the highlights of the Color Division's programs was Nicholas Haz's lecture and demonstration on "The Secrets of Color Composition." His participation in one of the several Color Slide Clinics provided helpful comment and criticism.

A long-to-be remembered lecture and demonstration was "Color Phenomena" by Professor Isav Balinkin, of the University of Cincinnati.

These are just a few of the many programs which were of special interest to color workers. This year's Convention program is expected to be just as interesting. We'll be seeing you in St. Louis in October.

Reproductions

Elsewhere in this issue are reproduced in black and white two slides which were accepted in the Fifth Chicago International Color Slide Exhibit. The Color Division has used this means for giving recognition to outstanding shows. "And No Place to Go" is by Clifford Matteson of Buffalo, New York; "Young Artist at Work" by K. Helmer-Peterson, Copenhagen, Denmark.

Color Slide Circuits

Color Division's "closed" color slide circuits (which correspond to the black-and-white portfolios) differ from the "open" circuits in only one respect—the participating personnel does not change.

"And No Place To Go"
Clifford Matteson, Buffalo, New York

Each of 10 participants enters 5 slides. The Color Division prepares the basic comments on each slide and members make their comments when the set reaches them. At the completion of the first circle, each entrant replaces his slide with five new ones, etc.

Persons desiring to join a "closed" circuit should write to Dennis Pett, 82 Merriman Street, Rochester 7, New York. Ultimately, if interest warrants it, a circuit competition may be developed.

"Young Artist at Work"
K. Helmer - Peterson, Copenhagen, Den.

Coming Exhibitions

5th Chicago Nature, at Chicago Natural History Museum, Feb. 1-28. Deadline January 17. Four slides, $1. Forms from Blanche Kolarik, 2824 S. Central Park, Chicago 23, Ill.

Whittier, Calif., Feb. 13-27. Deadline Jan. 31. Four slides, $1. Forms: Willis E. Reynolds, 417 N. Pickering Ave., Whittier, Calif.

Rochester, at Memorial Art Gallery, Mar. 4-13. Deadline Feb. 3. Four slides, $1. Forms: David S. Adams, Memorial Art Gallery, Rochester 7, New York.

5th San Francisco, Mar. 5-16. Deadline Feb. 19. Four slides, $1. Forms: Alice Cooper, 1 Montgomery St., Room 1504, San Francisco, Calif.

Michigan Nature, Mar. 23-Apr. 19. Deadline March 14. Four slides, $1. Forms: Roger E. Richard, 1823 N. Gulley Road, Dearborn, Michigan.

Halifax, May 25-27. Deadline April 30. Four slides, $1. Forms: Peggy Wright, 96 Quinpool Road, Halifax, Nova Scotia, Canada.

Nature Division

By LOUISE BROMAN JANSON
6252 S. Kedzie Ave., Chicago 29, Ill.

At the annual meeting of the Nature Division Executive Committee, one of the important decision was to organize a number of permanent special print and slide sets devoted to specific fields of nature photography, for example, birds, animals, insects, etc. It is intended that the photographs contained in these sets will represent the best in present-day nature photography. When completed they will be available without charge (except for shipping costs) to clubs, schools, and museums interested in viewing or displaying them.

Qualified members of the Division have been appointed to act as chairmen in the compiling of these special exhibits. It is urged that all photographers interested in the fields listed below submit their work for consideration.

In the case of color slides, duplicates will be made whenever the original can not be released. This should be noted when submitting transparencies. Slides covering all nature subjects should be sent to the head of the permanent slide set: Henry M. Mayer, 3438 W. 150th St., Cleveland, Ohio.

The prints should be completely finished to exhibition standards and mounted on 16 x 20 mounts. For the present the print collection has been divided into seven sections. All material submitted should be sent to the chairman of the specific field: BIRDS—Lawrence D. Hiett, 1945 Ottawa Dr., Toledo, Ohio; INSECTS—Louis Quitt, 838 Tonawanda St., Buffalo 16, N. Y.; ANIMALS (Not Domestic)—F. Eliot Westlake, 2424 Bremont Ave., Cincinnati 12, O.; REPTILES, FISH, FROGS, etc.—H. Lou Gibson, APSA, 5274 St. Paul Blvd., Rochester 12, N. Y.; FLOWERS—Louise Broman Janson, 6252 S. Kedzie Ave., Chicago 29, Ill.; OTHER BOTANICAL SUBJECTS (Ferns, Moss, Trees, Fungi, etc.)—Ruth Sage, 49 Johnson Park, Buffalo 1, N. Y.; GEOLOGY, ASTRONOMY, METEOROLOGY—William C. Janson, 6252 S. Kedzie Ave., Chicago 29, Ill.

It is hoped that nature photographers will cooperate in supporting this worthwhile project by submitting their best work for consideration.

The Philosophy of Nature Photography

When trying to crystallize thoughts on a subject, it is often convenient to find that someone like Shakespeare has said something that fits, although it is often disconcerting to find that your bright new philosophies are not so new under the sun. In fact, it is almost impossible to say something that has not been said before. For example, Shakespeare and I both feel that "All the World's a Stage." Now, for this Stage, the play was written by the Creator, but Nature is stage director. I know we can all turn in a better performance of the lines we have been given if we cooperate with the director. We can take two attitudes towards Nature's promptings—we can override them with our own ham acting and give an unsatisfactory performance, or we can heed them and give a more sensitive and happier one.

The first attitude can be figuratively typified by the man with a gun; one who *wantonly* kills, squashes, roots up, or otherwise destroys Nature's minor characters and eventually destroys himself. I do not mean the honest hunter here, because hunting is a natural instinct. I am referring to the mind that considers anything less powerful than itself to have no rights at all to a part in the play.

The second attitude can be similarly represented by the man with a camera; one who looks for the jewels in Nature's creatures and finds the gold in himself. Of course, I am including all Nature lovers

and men of good will here because I am referring to the mind that, given a major role, can give all players a chance.

To start at the beginning of man's recording of Nature, picture a pre-historic cave in the evening. It is slowly getting dark and, in the dim light, a man with stone tools is laboriously chipping out an animal on the wall of the cave. In front of the cave is his mate and she is crouched before a large fire roasting two mammoth steaks. She is a newlywed and true to form, accidentally lets one of the steaks slip into the fire. The flames melt the juicy fat and flare up brightly, lighting the anticipation in her face of the clubbing she is bound to get. What with mammoth steaks at 27 pebbles a pound, she knows trouble should be coming. However, the man with the stone tools, instead of grabbing his club in the approved manner, bends more closely over his work; the additional light makes the details of his carving show up more clearly. After ten minutes of his rapid chipping and her apprehensive waiting, he suddenly shouts; "Now throw *my* steak on the fire; I can finish this saber-toothed tiger before bedtime."

He had the attitude of the true artist and enthusiastic craftsman, and probably the science of illumination was born that day. He was the first Nature photographer and most of the early carvings included Nature subjects. Our attitude toward life and photography should be as enthusiastic as our caveman's. Of course, we work with different tools. Even with modern-day fast films, exposure times with burning steaks would be rather long. Our light sources vary from tungsten all the way up to the latest trend in speedflash lighting. What we have got to do is learn to enjoy our advantages as much as that prehistoric artist enjoyed the advantages over other rock carvers he obtained from the flickering illumination of burning fats.

I want to point out that I have had a lot of fun as well as satisfaction from photographing Nature. Particularly, I remember a series of pictures I made on web-building technique by a spider. The first night I went out I discovered that spiders have to tear down their old web before they can build a new one. She was halfway through the process by the time I was ready. This threw my schedule off so I quit that night and set up again the next evening to catch the tearing-down operations first. I thought the spider seemed a little bit nervous with all the activity around her. However, I got some good views of the web being torn down. That night she was too nervous to start building a new web. So the next night I set up again and found the only way to catch the various stages was to sleep on the couch and set the alarm clock for every half hour so that I could get up and make a few shots all through the night. The series was not too polished but it did show the operations, so the next evening I decided I had better go to bed. However, just around eleven o'clock I heard a knock on the door and opened it up and there was the spider, who said: "O. K., Big Boy, what do you want me to do tonight?"

You never know what you are going to run into in Nature photography. I had a lot of fireflies lying dormant in a match box in the refrigerator. In order to give them air I had opened the match box almost a half an inch. The janitor in the apartments decided to defrost the refrigerators in that wing and the next time my wife opened the ice box it was glowing all over on the inside as though a planetarium projector were concealed in the freezing compartment.

This put a crimp in my practice of subduing Nature subjects by chilling them a little in the refrigerator, at least temporarily. Of course, subduing your subjects is only part of the technical problem, but it is a large part because you will find that they have a great liking to fly, crawl, swim, hop, run, or wilt out of the picture. If you are technically minded you will find enough problems in Nature photography to satisfy your ingenuity.

There are artistic problems in Nature photography too. Of course, the prime requisite is a clear record, but there is no harm in making a pleasingly arranged setting either. In Nature subjects you really have beauty. The form, color and design of plants, butterflies, birds, insects, and numerous other subjects are endless. Therefore, the pictorialist can find a lot of satisfaction in entering the Nature field. He will find his ability taxed, especially in view of the wonderful quality we are now getting in Nature salons.

The pictorialist is fundamentally Nature-minded anyhow. Have you ever gone into his darkroom and heard him counting —one chimpanzee, two chimpanzee, three chimpanzee, etc.? I would like to suggest something here though—that he uses less dangerous and more appropriate animals in his counting. There is enough monkeying going on in the darkroom as it is! For example, one boa-constrictor, two boa-constrictors, etc., would be wonderful for the beginner developing roll film. Then the chamelion could be used for printing baby pictures because, after all, both are subject to change. Then there is the lyre-bird for travel shots and the rhinoceros for mother-in-law pictures. He could also use the ichthyosaurus for wagon wheels and other extinct themes. Finally, for making prints, there is the little spotted cus-cus from the Cape York Peninsula—one spotted cus-cus, two spotted cus-cus, the prints are spotted cus-cus!

It is bad to carry any of our interests to extreme. If we like an occasional game of poker on Saturday night, good! Four aces are an excellent morale builder. If we want to play the horses at the Hamburg Races once in a while, that is all right too. If we enjoy a night at the Statler, that is okay, if we can stand the tariff. Some of us have to work for a living. But we should not overdo any of these things especially the latter. We have to think about something during our leisure moments. I recommend an interest in Nature.

If you learn to know Nature you will know yourself and never get bored with either. And there is great comfort to be had in Nature too; she is so regular and predictable. The uncertainties of civilization are temporarily forgotten with the hopefulness of a robin's sure return. Or the rigors of a northern winter seem trivial at the first Hepatica. Again, when the geese fly north, we realize that *some* forms of life know where they are going!

—*H. Lou Gibson*, APSA

NATURE EXHIBITIONS

Rochester, at Rochester Memorial Art Gallery, Mar. 6-April 3. Deadline Feb. 3. Entry fee, $1.00 for four prints and four slides. Forms from David F. Adams, Exhibit Director, Memorial Art Gallery, Rochester 7, New York.

3rd Michigan, at Cranbrook Institute (Detroit), Mar. 28—Apr. 18. Deadline Mar. 14. Color and monochrome; entry fee $1.00 in each. Forms from Roger E. Richard, 1852 N. Gulley Rd., Dearborn, Mich.

Photo Journalism

By CLIFF EDOM, APSA
18 Walter Williams Hall
Columbia, Mo.

We were amazed—and pleased—to learn at the PSA Cincinnati Convention that a number of metropolitan newspapers are planning to reproduce color photographs by letterpress within the next few months. It appears that the news photographer who does not know color will soon be a thing of the past. Progress marches on!

Reports are that Marie Hansen and her husband, Wesley Nussbaum, only recently returned from Europe, are headed for South America. Miss Hansen is a former LIFE photographer and her husband a former LIFE writer. Marie says she may add movie equipment to her still cameras for the South American trip.

Our hats are off to Paul Threlfall, *Wichita Beacon*, president of the National Press Photographers' Assn., and to John Faber, *Birmingham News*, secretary, and Sam Mellor, *New York Post*, treasurer of that fine organization. NPPA continues to build prestige for the press cameraman. One of their biggest battles at present is for recognition in courtrooms. NPPAers believe it is not only the right—but the duty—of press photographers, to make a pictorial record of trials, etc., just as long as they do not upset the decorum or dignity of the court. We are happy they are gaining ground. More power to 'em.

Joe Costa, King Features, Inc., who midwifed the NPPA into reality and fondly nurtured the infant through those first critical months, must be very proud. Now, chairman of the Administrative Board and Editor of *National Press Photographer*, the voice of NPPA, Joe has every reason to be happy about the lusty youngster.

By the time this is in print, two anxiously awaited books will probably have put in appearance. We refer, of course, to the first Press Photography Annual, and the volume to be published by the Society of Magazine Photographers. Both, we predict, will be *musts* for the photo-journalist's bookshelf.

Thumbing through a May 1875 issue of *Scribner's Monthly*, we recently found this item: "To enable the photographer to take pictures in dark rooms, caves, mines, ruins, and other situations where there is no sunlight, light is produced by throwing a low pressure jet of oxygen upon a mass of melting sulphur. The sulphur is melted in an open crucible over a spirit lamp. The moment it flames, a jet of oxygen delivered through a small glass discharge pipe, is turned upon it, and a bluish light of great actinic power is obtained. A suitable chimney, having a good draught, must be provided to take away the products of combustion." What would these folks think if they could see the convenient "peanut" bulbs or the high-speed flash units of *today*?

Staff photographers everywhere must have been chagrinned by the cameraman who attempted a sneak shot of Earl Warren, while the vice presidential candidate was casting his ballot at the presidential election. Warren, justifiably, we believe, "blew

a fuse." The photographer then did the gentlemanly thing—relinquished his exposed film.

Paul Berg, staffer for the *St. Louis Post-Dispatch* Sunday PICTURES, has done some excellent photography in a long-range campaign for slum clearance. Berg's pictures have appeared both in black-and-white and in color.

A. Aubrey Bodine, FPSA, is one fellow right at home in any photographic crowd. Tops as a salon exhibitor, he is one of the nation's best rotogravure cameramen. For years he has done a bang-up job as photo director for the Baltimore Sunday *Sun* Magazine.

Congratulations to the Press Photographers' Assn. of New York. For their exhibit at the NYC Jubilee Celebration they collected 50 pictures depicting events from 1898 to the present. With this collection as a nucleus, they plan to fill in the gaps, keep the exhibit up to date, and thus perform a great and lasting public service.

One can't help but experience a thrill at mention of the f-1 "night camera," the "instant" camera demonstrated at the PSA Cincinnati Convention, Xerography, and at the process which permits radio transmission of an entire novel the size of "Gone With the Wind" in a few minutes. Surely here is an open door for the photo-journalist of the future. What a marvelous age in which to live.

PSA JOURNAL *Territorial Columns*

Canada

By BLOSSOM CARON, APSA
77 Sunnyside Ave., Westmount, P. Q., Canada

The Manitoba CC and the Camera Guild of Hamilton are pleased with themselves, and rightly too, for haven't they achieved the impossible? They have found fine new quarters which in this day and age is something to boast about.

After snooping around for gossip about our color enthusiasts, we learned that Mary Owens won the PSA medal for the best adjacent color study at Columbus and that Sam Vogan was judge at the Canadian Medical Art Association Exhibition; also that Cyril Smith won the club trophy of the Color Photographic Guild of the Maritimes. This took the form of a cup—not apple blossom stationery. You see there was some amusement when Cyril and Russ Heffler won prizes at the last CPAG show, which turned out to be boxes of stationery featuring their own apple blossom transparencies.

Down in Halifax the clubs do not admit women to membership. Just think what they are missing! Probably they will wake up to that fact one of these days and be kicking themselves for lost opportunities, —photographic, of course.

The Rotary Club of Sydney Mines sponsored an amateur photographic salon to raise money for the Crippled Children's Society. Judging by the enthusiastic response of many of the clubs, it must have been successful.

To jump from one coast to the other, the Vancouver PS is taking a breather. It is our sincere hope that one of the best clubs in the country, after giving itself a good yawn and a shake, will start the New Year with renewed vigor.

Frank Hopkins and Ed Zeller of Montreal attended the PSA Convention and had a wonderful time. In the course of their comings and goings in Cincinnati they bumped into other Canadians: Harry Waddle of Port Dover, Evelyn Hill and Muriel Barrett of Hamilton, the Dick Birds of Regina, and last, but not least, the Sam Vogans of Toronto.

Conspicuous in recent salon catalogues are three of our Hamilton friends—Harry Waddle, Myer Barrach and Jack Cartledge. The Hamilton CC certainly is an active bunch, as their bulletin, "The Bellows," indicates. By the way Phil Croft, now of Toronto and formerly of Montreal, was one of this season's speakers.

Talking of speakers, Toronto was lucky enough to prevail upon Anne Pilger Dewey, APSA, secretary of the PSA, to accept an invitation to visit them.

Another feather in Toronto's cap is that Canada's most distinguished photographer, Yousuf Karsh, FPSA, has recently become a life member of the club. A copy of his letter accepting this honour was reproduced on the cover of "Focus."

One of the club's leading workers, Roy Hargreaves, won a prize for the best print of the show in an Indian Salon. He has also been successful in England, Belgium, Holland and elsewhere. This news had to be pried out of Roy who is very modest about his accomplishments.

The Montreal Amateur Photographers held a most successful club show in November at the T. Eaton Co. Store. Among their 100 prints were several hand-colored ones.

We read in the Victoria "Close Up" in reference to Stephen Jones and his fine work in handling their international: "One of his latest innovations has been to send radio messages to all Thunder Bird crest winners giving them the good news." All Canadian Exhibitors know about the coveted crests but probably not about this innovation.

New England

NEWELL GREEN, APSA
64 Girard Ave., Hartford 5, Conn.

New England had reason to be proud when the honors were announced at the Annual Honors Banquet, which climaxed the PSA Convention in Cincinnati last November. There were only five Fellowships awarded in the Society this year, and two of them went to New Englanders. One went to L. Whitney Standish, of Boston, who not only makes superlative prints but is outstanding as a lecturer and teacher. The other went to John H. Vondell of Amherst, Mass., who has done so much to further amateur photography in this area, both as president of the New England Council of Camera Clubs, and as a speaker, critic and judge who has always been generous with his time and glad to help. Whit and John have a host of friends throughout the section, and we know they are all happy to congratulate them.

Other camera clubs may celebrate their 10th and 15th anniversaries, as we have noted now and then in this column, but the Worcester (Mass.) Photo Clan beats out nearly all of them, because they met the first of December to celebrate the beginning of their 25th year. To mark the event, Prof. Charles J. Adams, who was one of the founders and still a member, gave a talk on the history of the Clan and told about the other founders. Also at this meeting five of the members scored and discussed the entries in the Fall Competition of the New England CCC.

We just heard something which made us wish we lived a lot nearer Boston. The Boston CC announces that its winter educational series will be a course in advanced print-making by L. Whitney Standish, FPSA. It will start the middle of January and be a series of "How-to-do-it" lectures with a demonstration at each session, given in the club's meeting hall, which contains a well appointed darkroom right on the speaker's platform.

Harold Orne, who lives in Melrose, Mass., but who spends enough time in New Hampshire so that a lot of his pictures keep turning up in "The New Hampshire Troubador," spoke to the Boston "Y" CC in November on snow photography. Mr. Orne has been a PSAer for a number of years and we used to see his name in the salon catalogs pretty regularly. Lately, we understand, he has been doing a great deal of color. At any rate, he illustrated his talk at the "Y" CC with both black-and-white prints and color slides.

Walter Klar, who is Supervisor of Art in the Springfield (Mass.) Public Schools, spoke to the Color Division of the Springfield PS in November. His topic was "Artists See Differently." That's no news to anyone who has had to judge a salon with an artist on the jury, but a talk by an artist as to why they see differently is something these old ears still have to hear. Perhaps Mr. Klar had the answers.

The battle of words still rages between Pop Warner, who writes in Everett (Mass.) CC's "Viewfinder" and Ray Leblanc, who edits the "Monthly Bulletin" of the Connecticut Valley CC of Hartford. Each claims to be the champion camera club "gas bag" of the area. In the latest round, Pop actually invaded Ray's home grounds. A carload from the Everett CC, including Pop, drove down to a Connecticut Valley meeting and timed it beautifully. They arrived right in the middle of a technical discourse by Ray. After that, both he and Pop did the talking. Nothing was settled about the championship, though. Ray wouldn't argue about color which is Pop's specialty, and Pop wouldn't give out on gamma, which is Ray's, so the meeting broke up at 11:45.

The New Britain (Conn.) CC is trying out a method for print competition scoring which is novel to say the least. Every time a member brings in a print for the monthly competition, he gets one point added to his cumulative score. If the print places, that too is added. But here's the catch. Whenever he *doesn't* bring in a print, one point is subtracted from his total. Lucky some club members we know aren't in the New Britain group. They'd end up the season about minus nine.

Middle Atlantic

By WILLIAM F. BLAKENEY
34-35 76th St., Jackson Heights, N.Y.

Photographs, which for more than 20 years were refused official recognition in New York's Borough of Queens either as an art or craft, have finally been accepted. The change came with the hanging in Jamaica Armory during New York's recent Golden Jubilee Celebration of 200 photographic prints, including a special exhibit by Dr. D. J. Ruzicka, FPSA, of Jackson Heights, L. I. At the opening of the celebration the photographs were commended officially and promises were made publicly that photography will be given its own section in the new Queens Art Museum.

Largely responsible for this victory were Laura and Lisle W. Wright, Bayside, L. I., members of the Queens CC, Rockefeller Center CC and PSA, and ardent workers for the Metropolitan CCC.

The photographic exhibit was judged by Valentino Sarra, FPSA, Toni Venti, and Carl Sanchez, Jr.

Jesse O. Sprague's tripod and camera now rest, for their owner has passed on to a scene where light is eternal and time immortal. Through the years, from the early beginning of camera clubs, he has been devoted to furthering the Syracuse CC as corresponding secretary and treasurer, and his letters, prepared by crippled hands and with poor vision, went far and wide. For his devotion to photography he will be missed in PSA circles.

In the Metropolitan section there will be a new contender for honors this year, The Equitable Life CC. The club is new in Metropolitan Council activities but the members show long photographic experience by some of their work.

The Inwood CC, which finished with only one or two points difference from the Manhattan CC in the New York City contest last year, has one of Manhattan's top print makers, Joe Pichler, as instructor for all of the club's courses.

A popular speaker around the clubs this season is Stanley Rayfield, who has been guest instructor on several of the Metropolitan CCC's night field trips.

The Brooklyn Institute, Department of Photography, recently proved that a top grade judge must be able to show that his criticism is correct, when they had one of New York City's most popular judges, Carl Sanchez, Jr., conduct a print criticism on how to make old pictures better.

The Ridgewood CC of New Jersey was recently visited by Miss Pat Liveright, who gave a demonstration on portraiture.

Lloyd E. Varden, FPSA, of the Pavelle Color Laboratories, was host to the Village CC of New York, at the laboratories, demonstrating how color film is processed at the rate of several thousands a day.

The Queens Borough CC's field trip chairman, John P. Freely, had a group of 25 people on their trip to Pound Ridge State Park for color shots. Ray Godley, who had just won a movie camera, was giving it a good workout. Paul Cartwright was busy catching the colors worn by the ladies.

A scientific photography lecture was given on photomacrography and photomicrography with color at the South Shore CC by Jay T. Fox, APSA. Mr. Fox, who resides at Seaford, L. I., has his own museum, the Fox Museum of Natural History. He is a member of 25 scientific societies, of which 11 are honorary. Mr. Fox's talk was illustrated with 100 Kodachrome slides of nature and scientific subjects and the equipment he uses.

Members of the Perth Amboy CC are blushing with pride on being invited to exhibit at the Perth Amboy Ladies' Club Annual Art Show this year. At a recent meeting Doc Kemeny remarked, "To be a photographic critic one must know of what he criticizes . . . but a judge need only express an opinion."

Lou Jacobs, of the Teaneck CC, reports that their birthday party was a huge success. Joe Harley showed two entertaining movies. The members were pleased to have their old member with them, Clyde T. Boyles, and his wife, Ruth.

Al Shelton, of the Ansco CC Department, spoke at the Albany CC, Albany, New York, on "Pictures and How to Find Them."

The Glen Falls CC was the November host at the third interclub competition of the Hudson Mohawk CC's Assn.

Ken Dunlop, of Amsterdam, was the winner of the grand prize in the "Scenes and Still Life" Class of the Albany Knickerbocker "News" Snapshot Contest.

Why not send in a problem to Camera Clinic, in care of Radio Station WROW, Albany, New York? If your problem is discussed on the air you will be sent a copy of "How to Make Good Pictures," or if you have this, an adequate substitute.

Irene M. Heffner of Albany, won third prize in the recent Rembrandt Traveling Show. The show was judged by C. T. Boyles, past president of the Metropolitan CCC; Arthur S. Mawhinney, FPSA; and Levon E. Rouhian.

Hans Kaden, FPSA, had the advanced group of the Jamaica CC out before the sun was up on their first field trip of the season.

Visitors to New York City who would like to know where they may go to take pictures can go on the P. P. A. field trips. The trips are free and open to anyone, with or without a camera. Meeting place is at the north flagpole of the New York Pubic Library at 42nd Street and 5th Avenue regardless of the weather. This is one way that you may see some of the hidden spots of the big city and not worry about getting lost. The trips are held every Sunday at 1:00 P. M.

South & Southwest

By H. D. *(Herb)* OHM, APSA
P. O. Box 331, San Antonio, Texas

Gordon C. Abbott, FPSA, of Taxco, Mexico, recently made the long trek to Chicago to participate in the judging of the Chicago International. While there he had to enter a hospital for, as he says, some repair work, forcing him to miss the Cincinnati PSA Convention. Best of luck, Gordon, and maybe we'll see you in San Antonio on your way home.

Newly elected officers of the Oklahoma CC are H. W. Nation, president; George Fiellin, vice-president; Louis McPheeters, secretary; and Gilbert Hall, treasurer.

The Amarillo Photo Society has made arrangements with Mrs. Laura Gilpin, APSA, of Sante Fe, to give a series of lectures and demonstrations in Amarillo. These lectures are to be open to members of all photographic clubs throughout the Texas Panhandle. This is fine cooperation and should bear fruit in the way of better relations between the various clubs in the area.

Two members of the Llano Estacado CC of Borger, Texas, walked off with first and second prizes, at the Tri-State Fair at Amarillo. C. C. Fryling captured first and Wallis Nelson's print "Perspective" won second.

The Birmingham CC "News" features a cover picture and four others on inside pages, all prize winners in their monthly contest, that are really honeys. "Aspen Lane," by Tom Barr, particularly captured the fancy of your editor—what a bromoil it would make. First place winner, "Bivouac" by Harry Porter, is an especially fine piece of work.

This club is working on a project for the Department of Public Welfare, rendering a real public service. They are making pictures for the Department publication in which their activities are dramatized by using hands to show the many phases of their work. Besides rendering a public service they are gaining valuable experience and having a lot of fun.

The editor of the Atlanta CC "News" reports a new trend in the old "Paris postcard" racket. He recently opened one of those open-end advertising envelopes, from Hollywood, and out fell three Kodachrome slides of three comely young ladies—sans drapery, sans clothing and, as he says, sans everything. No use trying to talk him out of these slides fellows—he's a married man and therefore hunted up the nearest trash can! At least, that's his story.

Dr. Ted Leigh's picture, "The Doctor," which adorns the cover of this very handsome club paper (a real slick) is very striking.

The Photo Society of San Antonio is undertaking a new project. A class in bromoil, for the more advanced members, is to be conducted by yours truly. A model night was recently held, featuring players from the San Antonio Little Theatre. Some very good character studies were made. This club has been growing by leaps and bounds and should be one of the largest clubs in the Southwest before the end of the year.

Bill Reeves, of the Dallas CC, reports that their group is still working hard. They recently held a meeting at the studios of Photo Associates at the invitation of Ulric Meisel, one of the partners, which featured a lecture on the dye transfer process. This club is quite color conscious and we should be seeing some of their color work exhibited in the salons before long.

Midwest

By WM. E. *"Gene"* CHASE, APSA
4164 Federer St., St. Louis 16, Mo.

To those who failed to attend the greatest photographic event of 1948, the PSA Convention, let me say that you were the loser. Not only were there many fine programs, ably presented by outstanding authorities, on every photographic subject imaginable, but also here was the opportu-

nity to meet and become personally acquainted with all those whom you have read and heard about, and to find out for yourself what nice people they really are. To P. H. Oelman, FPSA, General Chairman, and his hard working Committee goes the orchids for smooth and efficient handling of the 1948 PSA Convention.

While I am on the subject of PSA Conventions, let me remind you that you have a date for the 1949 PSA Convention to be held in St. Louis, Mo., on October 19, 20, 21 and 22. St. Louis is already hard at work on the project and promises to have many fine features in store for you, so be sure to save a part of your vacation for *your* PSA Convention.

The Cleveland Photo Society recently engaged Nicholas Haz, FPSA, for a six weeks course on "Image Management—Composition for Photographers." Not content with bringing Nicholas Haz to Cleveland, the CPS also had B. Erle Buckley, APSA, for a lecture on "An Approach to Pictorialism."

The Copper Country CC of Calumet, Michigan, recently took advantage of PSA's offer to supply judges for CC Print Contests and selected Kenneth Marsh of Detroit, to judge and comment on their prints. Kenneth obliged by appearing in person, and in appreciation the Copper Country CC turned out a record attendance. Kenneth not only suggested improvements to be made on the prints but he also discussed means of obtaining print quality and various tones and gave the CC a much needed lift in interest and morale.

From "The News Letter" of the Central Ohio CC Council I learn that the Movie Makers CC presented Ralph E. Gray, APSA, in a program of 16 mm color sound movies, including "Primative Patzcuaro" and "Typical Times in the Tropics."

At a recent meeting of the Omaha CC, Paul Gillespie, Clarence Teal and A. L. Bliven discussed the subject, "What Makes a Salon Print," using some of their own prints to illustrate. The second half of the meeting was turned over to the Color Slide Division.

The Omaha Movie Club has elected the following officers: Ronald Pierce, President; Gladys Rohrs, Vice President; Fred Classen, Secretary; Theodore Nelson, Treasurer; and Clyde Tite, Harold Ramsey, William Charnley, Directors.

The Photo Pictorialists of Milwaukee have elected the following officers to serve through 1949: Walter Sheffer, President; Elmer Cusick, Vice President; Enoch W. Miller, Secretary; Victor Pagel, Treasurer. These officers together with the retiring President, Ray Miess, will comprise the Board of Directors.

A new type of CC program has been originated by Fort Dearborn CC. It consisted of a round table discussion with D. Ward Pease, APSA, asking questions of the "quiz kids"; Nicholas Haz, FPSA, Harry K. Shigeta, FPSA, Gordon C. Abbott, FPSA, and "Spee" Wright. The questions were based on salons and the problems of the judges and the exhibitors. Reports have it that the discussions waxed hot and furious with both sides getting their pet gripes off their chests and everyone going away feeling that it might be the beginning of a new life for salons.

From the News and Notes of the Association "News," published by the CACCA, ably written by "Newsnose" Jane Edwards, I learn Morris Gurrie, of Fort Dearborn CC, has his book, "The Complete Book on Enlarging," in dummy form and that the publishers promised to have it ready before Christmas. Supplementing the 75,000 words of text are scores of illustrations.

West

By JACK CANNON
3961 Sacramento Street
San Francisco, Calif.

District Representatives' and reporters' lack of items submitted indicate a dirth of news so we'll start with this sad substitute. It has to do with a local gadgeteer whose new tele-minnie setup needed a good test-hopping. The crystal-clear day needed finally arrived and so off he went to all the neighboring hill tops and vantage points to find distant vistas to bring in. A roll of prize-winners (of course) was shot. Happily the cassette was rewound and prepared for an air mail trip to the lab . . . . and —then came the dawn . . . . the filter had been forgotten on the Type A fillum, b'gum. (I have since promised myself to be more careful in the future.) A visiting friend points out the fact that the saddest part of the tale is the long, long, long wait for another clear day in SF, which we hasten to state is pure blasphemy. And from Montana, too.

Jack Wright wouldn't tell this on himself but Gladys W. isn't so modest. Seems that J. W. merely got the All State Fair Popular Award for one of his long-since proven popular puppy pix. Speaking of Mrs. W. reminds me of a combination that with a little urging could amount to something. Gladys raises orchids. The Ab Hulls of San Fernando Valley plan to raise chinchillas. Now if they could get together and provide a corsage and a fur coat couldn't I raise Ol' Ned . . . .

A Big Happy New Year and thanks galore to all those that have contributed slides for "The Boys." The success of the Baumgartel-Cannon venture is assured—as a matter of fact our goal of 2000 slides has been passed, thanks to DeWitt Bishop's Sierra CC platoon of good Joes. The Sierra CC package arrived yesterday with 524 slides—Yes! 524: count 'em. That gives a nice target for other organizations to shoot at; there must be some other CC's with hearts at least Sacramento size, (but I don't know.) Anyhow—thanks Sierra, and the Boys thank you, too.

Bill Patterson went south to a football game; he ended up at a kid's party. Bill is planning to forsake football. While in L. A. he motored to Shirley Hall s house and rang the bell—and had the door opened by Shirley who stood there, traveling bags in one hand and the PSA Convention Program in the other. All in one breath, he said, "Hello Bill and goodbye."

Have you read your copy of the KA MOOLELO PAI KII lately? That, if you don't already know, is free translation for "The Photographic Record of The Camera Council of Hawaii." Vol I, No. 1 to hand and let us pat on the back all those that worked so hard to get it out, and needless to say, did nobly. At this moment of writing the members of the above CC are in the midst of Aloha Week—the ultra time of year from the celebration standpoint in those lush and greatly missed Islands. Luckless malahini.

The Cameraderie Club of San Jose comes in for a mention and congratulatory word as well as good luck wishes. It has recently passed a milestone in the event of its First Annual Color Banquet featuring the Year's Awards, complete program and some of Wing's Restaurant's (plug) finest vittles. Many more to you. Item of doubtful importance is the fact that the trio of judges for the event was comprised of Pink Arntzen, Ed Rea and J. Francis Cannon.

Bay Area CC are readying party plans. California CC has an Italian food emporium staked out. The Photochromers have about planned on the Big Strong Marines' Memorial Bldg. private dining rooms . . . . the gals run this one . . . . easy to see.

This is real devotion. The Portfolio Lady, Frances Robson, arrived back from the PSA Convention and instead of making a bee-line for home and hubby went straight to the meeting at the California CC. With her new APSA for which added congrats. Told of the get-together which was better than expected in way of attendance and of the West Coast contingent . . . Robson, Searle, Blew, Fayman, Bishop, Newhall, Archer, Halls, Chao-Chen Yang, and possibly others. Claxton Searle, the Mainliner CC railroad fan, is combining a vacation with the convention trip and personally checking every switch and chunk of Hot Iron from here back and return.

One more—congrats to Retlaw and it's nifty "Retina." The writeup of the steak fry was good—the baseball game: Hoolihans vs. Hooligans a classic. Score 22 to 4. The Hans make two-baggers and double exposures—the Gans do with three-baggers and triple exposures. Two new members took pictures—what . . . yes, pictures.

Washington Council

The green light has been given on the PSA International Exchange plan in the Washington Council and by this time their show will be on its way overseas. Tentative first exchange is with China, where Francis Wu has gathered a fine representative show. Phil Jennings, WCCC print director, is handling most of the details in Washington, with George Kinkade as International Exchange representative in the Council.

Cliff Thompson is the new prexy of Central Washington's Yakima CC. Clyde Edwards is vice president; Harry Throssell, director for black and white; Herb Strausz, director for color; Susie Ulrich, secretary.

The Evergreen CC of Seattle played hosts to the Washington Council convention in a royal manner. Features of the big day were the showing of high scoring prints from the year's traveling salons, with voting for print-of-the-year; speeches and demonstrations; a slide contest; banquet; and model night with variety to suit everyone's tastes. Winner of the Bremerton trophy for print-of-the-year was Harold Christenson of Skagit and Foto Alpine CCs with his "Wind, Mountain and Man." J. M. Brame of the Yakima CC captured first place in the slide contest; H. Sykes, also of Yakima took second; and Bob Snively of Foto Alpine was third.

Awards were also made at the convention for winners in the Foto Alpine sponsored contest at the annual WCCC picnic, held in August. James R. Stanford, APSA, of the Olympia CC, took first for black and white; John Mardesich of Foto Alpine, first for color. Ted Lukin of Seattle, last year's winner of the Bremerton trophy, was presented a permanent cup by the same club.

1. Photo-Journalism Program: Stanley E. Kahsh, Cliff C. Edom, Isadore A. Berger. 2. Joseph M. Bing presents first PSA Progress Medal to Dr. C. E. K. Mees. 3. PSA Officials at Exhibition Opening: Charles Heller, President C. B. Phelps, Jr., John G. Mulder. 4. Miss Doris M. Weber, John R. Hogan, Dr. James O. Fitzgerald, Jr., 5. Thomas and Mrs. Firth, Eldridge R. Christhilf, Lewis T. Reed. 6. Herbert M. Howison, Dr. H. Clyde Carlton, H. Lou Gibson, Frank E. Carlson. 7. Burton D. Holley, John R. Magee, Jacob Deschin at the opening of the PSA Exhibition. 8. Prof. Isay Balinkin lecturing on "Color Phenomena." 9. Part of the Western Delegation at Cincinnati: Seated—Elbridge G. Newhall, Claxton Searle, Mrs. Frances S. Robson, Lejaren a Hiller, Mrs. Archer, Fred Archer, Standing— Mrs. Newhall, Mrs. E. W. Blew, DeWitt Bishop, Lyon Fayman, E. W. Blew, Chao-Chen Yang. 10. Donald J. Mohler, George Espy, George Blaha. 11. Rochester Table at PSA Banquet: Clockwise—Lou Parker (with pipe), Howard C. Colton, Ralph Sutherland, Chester W. Wheeler, Charles Foster, Emerson L. Scott, John W. McFarlane, Charles Kinsley, Melvin Wright and David Adams. 12. Demonstration on Makeup for Color Portraiture by the Merle Norman Cosmetic Studio. (Photos 1, 2, 3, 8 by Fred Quellmalz, Jr.; 4, 5, 6, 7, 10, 12 by Hy Schwartz; 9 by DeWitt Bishop; 11 by F. B. Kelley, Jr.)

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P.S.A.

CONVENTION PHOTOS

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13. Clinic on Cameras, Printing and Processing Problems—T. T. Holden, Adrian L. TerLouw, Charles W. Senger, John M. Centa, Dr. E. P. Wightman. 14. Motion Picture Division Banquet: Mrs. Richterkessing, Frank Richterkessing, Harris B. Tuttle, Vincent H. Hunter, Mrs. Tuttle. 15. Technical Division Luncheon: Frank E. Carlson, H. Lou Gibson, Beaumont Newhall, Dr. Walter Clark. 16. PSA Banquet: Stuart M. Chambers Presents Peabody Award to Eldridge Christhill. 17. M. A. Woodbury, Mrs. P. H. Oelman, John Magee, Mrs. C. B. Phelps, Jr., 18. President Phelps Presents Clerk Maxwell Award and ASPA to Louis Condax. 19. Chao-Chen Yang, Paul L. Gittings, L. Whitney Standish. 20. Hy Schwartz Demonstrating the Kalart Camera to Claxton Searle, and Fred Archer. 21. Lejaren a Hiller and P. H. Oelman at Oval Table Society Reception. 22. Col. Frank Liuni and Col. George Goddard. 23. Mrs. Barbara Green, Miss Eleanor Parke Custis, Dr. John Benus, Jacob Deschin. 24. Stuart M. Chambers, Adolph Fassbender, C. B. Neblette at the Presentation of the Honorary Fellowship to Mr. Fassbender. 25. George T. Eaton, John I. Crabtree, William Swann Discussing PSA JOURNAL. 26. Edward W. Beach and Ralph E. Gray. 27. B. Erle Buckley Conducting His Famous Print Clinic. 28. Dr. Edwin H. Land. 29. Michael J. Roll and Harry K. Shigeta. (All photos by Fred Quellmalz, Jr.)

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14. 1948 PSA Convention

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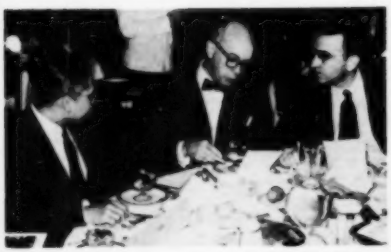

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New Camera Makes Photo Quick as Click

Invention Makes Photography Exceedingly Easy

BY JERRY RANSOHOFF

Anybody can be a photographer now. It's easier than rolling off a log. All you have to have is the new Land One-Step Photographic Process camera.

Quicker than you can say the name, you can have a completed print.

Dr. Edwin H. Land, of Cambridge, Mass., inventor of the camera, came over to The Post to demonstrate. He's in Cincinnati as a special guest of the Photographic Society of America, meeting at the Netherland Plaza.

DR. LAND'S CAMERA isn't much bigger than a large folding camera. It weighs 4½ pounds. But its resemblance to the conventional camera stops right there.

You open the back of the "Land" camera and drop in the film, leaving a tab sticking out one end. No more pinched fingers threading tight rolls. One pull on the tab and you're ready to shoot.

After the picture is taken, you pull the film tab out again, as far as it will go and wait one minute. Then you open the back of the camera and pull out the completed picture, separating it from a negative.

The camera is all ready for another shot.

IT'S THAT SECOND pull on the tab that does the revolutionary trick. It draws the film between two rollers, crushing a tiny chemical capsule which spreads developer over the film, prints the picture, and "fixes" it—all in 60 seconds.

Dr. Land, who is only 40 (and looks 10 years younger), is a graduate in physics from Harvard University. He and several associates formed the Polaroid Corp. 15 years ago, with their chief asset a process for making material which polarizes light waves.

He headed a huge Navy laboratory during World War II, and says he worked on the camera "in my spare time—which wasn't often."

"AT THE END of the war, I got down to serious work on the camera. I had more time then," he added.

Dr. Land's "capsule" process first was disclosed a year ago, before the camera had reached its present stage of development. Since that time, he has been refining and redesigning it for popular use.

11-7 THE CINCINNATI ENQUIRER

THE CINCINNA[illegible]

Camera Prints Photo In Minute!

Inventor Demonstrates Process In Snapshot Of Convention—Society Awards First Progress Medal To Research Executive.

BY JACK DUDLEY.

Picture-in-a-minute photography emerged from the laboratory stage and became a reality in a demonstration last night before the Photographic Society of America at the Netherland Plaza.

Dr. Edwin H. Land, Cambridge, Mass., inventor of the process and President of the Polaroid Corp., took a picture of his audience with a small hand-held camera and one minute later showed the finished permanent print which the camera had taken.

Dr. Land disclosed that the camera he was using, a production model, would be available to the public in a few weeks.

The camera will sell for well under $100 at about the same price as other folding cameras taking the same size picture, 3¼ by 4¼ inches. The film will cost a few cents more a picture than regular snapshots, he said.

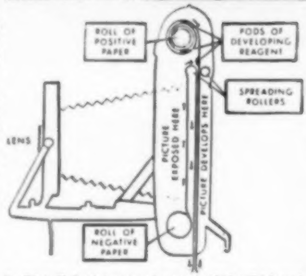
Containing no tanks or liquids, the camera utilizes a special film which makes the picture automatically when it is moved up for the next exposure.

Dr. Land's audience was impressed by the simplicity of operating the camera as he clicked the shutter, pulled a tab, waited a minute, opened a door in the back of the camera and lifted out the picture. The print, on semigloss paper, was a rich sepia tone with white border and deckle edge. It was of portrait quality, clear and sharp and suitable for enlargement.

Dr. C. E. Kenneth Mees, Rochester, N. Y., Vice President in charge of research for the Eastman Kodak Co. and internationally known photographic scientist, received the first Progress Medal of the Photographic Society of America.

The award was given to Dr. Mees last night for his many contributions to photography in the technical and literary fields.

In connection with the award, Dr. Mees delivered the society's first Progress Medal lecture. It dealt with the work of the Kodak research laboratories.



Dr. Edwin H. Land, inventor of a camera which will take and develop a picture in a minute, is seen at the top focusing a production model of his "brainchild." At the bottom is a diagram of the camera which discloses that the picture is exposed on regular photographic negative paper. The paper then passes over rollers that spread pods of developing reagent over it transferring the image to positive paper, thereby making a permanent print.

Nov. 6th.

"Shutter Bugs" Convene—

New Instant Camera To Be Shown Before Photographers

"Shutter bugs" poured into the Netherland Plaza Thursday, flash bulbs were exploding everywhere on the third floor of the hotel ... look on the appearance of a pic-

... ture gallery as the Photographic Society of America opened its annual convention.

Approximately 700 delegates were absorbed in a variety of workshop sessions which took up such topics as color photography, motion-picture, photograph journalism, camera clubs, nature studies and similar professional and hobby classifications.

Interest in the convention centered in the new polaroid and camera which was to be brought to the convention late Thursday by its inventor, Dr. Edwin H. Land, New York. The new camera, developed principally for the use of amateurs, takes a picture and prints within one minute.

The special film, it was explained by Robert C. Casselman, Cambridge, Mass., is equipped with a "pod" which contains the necessary developing materials. After the film is exposed, the photographer pulls a tab which breaks this pod and within a minute the picture is ready to be "peeled" out of the camera. The film is automatically destroyed when the print is made.

Casselman said the camera, selling for under $100, had a special advantage for amateurs and commercial users who could immediately see the results of their work and if not satisfied could make further attempts.

One of the highlights of the program will be a talk on portrait lighting by Fred Archer, head of the Los Angeles School of Portraiture.

Archer, in an interview Thursday, explained that "a good portrait is not just a map of the face. It must contain an expression known to the subject's friends—not just a fleeting expression." He added that "dead-pan expressions and flat lighting which gives no modeling to the face are the two most common faults in portrait photography."

His school, he said, is adding motion picture work the next semester. During the war, considerable interest developed in documentary and visual training films but this interest later waned. In recent months, however, there has been renewed enthusiasm along these lines.

Dr. C. K. E. Mees, head of the research department of the Eastman Co., Rochester, N. Y., will receive the Gold Medal Award at the convention for progress in photography.

Sunday, October 31, 1948

Photographers, Nurses In Staging Of Conventions

Professional and amateur photographers and educators in the field of nursing will occupy the center of the convention stage here this week with an estimated 1,600 participating in their meetings.

About 1,000 camera enthusiasts from all parts of the country will be on hand for the annual meeting of the Photographic Society of America Thursday through Saturday at the Netherland Plaza.

Members of the Ohio League of Nursing Education will hold their ... annual convention at the Hotel ... Thursday and Friday.

In addition to featuring a comprehensive educational program for all photographers, the photographic society will present a number of outstanding technicians in the camera field.

Among them will be Dr. C. E. K. Mees, Rochester, N. Y., who is recognized as the world's foremost research scientist in photography; Dr. Edwin H. Land, inventor of the revolutionary Land-Polaroid camera; Eleanor Parke Custis, Washington, artist and photographer; Fred Archer, Los Angeles, Calif., Director of the Archer School of Photography; Harry Shigeta, Chicago, commercial and illustrative photographer, and Howard C. Colton, Rochester, N. Y., manager of the color products information section of the Eastman Kodak sales department.

Cincinnatians who will take part in the program are Prof. Issy Balinkin of the University of Cincinnati; Nicholas Hax, author of "Image Management"; Karl Maslowski, nature columnist for The Enquirer, and P. H. Oelman, General Chairman of the convention.

Dr. Land will demonstrate his new camera Friday night. It is designed to produce a finished print and a negative within one minute of the click of the shutter. He will take a picture of the audience and immediately show the finished picture.

Recognized as a scientific achievement when the method was first disclosed last year, the camera has attracted much public interest since it first entered the laboratory stage. Dr. Land will use a stock model which will soon be released commercially.

With the exception of the technical sessions at which the problems of the industrial photographer will be discussed, the majority of the lectures and demonstrations will be devoted to the amateur photographer.

These will include the following topics: composition, both monochrome and color; portraiture; negative and print modification; new applications of flash to outdoor color photography; travel and vacation pictures; photographing flowers and birds in color, and making movies of football games.

The convention exhibit of photography will receive a preview Wednesday night at the Art Museum. It will include displays of pictorial, color, nature, press, technical and motion picture work.

Clifford Edom, assistant professor of journalism, University of Missouri, exhibited samples of early newspaper photography.

Among outstanding photographers to address the group will be Harry K. Shigeta, Chicago, famous for his black and white pictorial compositions.

THE NEW YORK TIMES, SUNDAY, NOVEMBER 7, 1948.

CAMERA NOTES

PSA Honors Announced —Oval Table Awards

CINCINNATI — Four New Yorkers shared in awards made here last night at the Honors Banquet of the 1948 convention of the Photographic Society of America. The PSA honors are the highest American awards for photographic achievement.

The New York list was headed by Adolf Fassbender, who was made PSA Honorary Fellow in recognition of more than a half century as photographer, pictorialist and teacher. Mr. Fassbender is also an honorary fellow of the Royal Photographic Society of Great Britain.

The other New Yorkers, who received associateships, were Henry M. Lester, John A. Norling and Jacob Deschin. Twenty-two other associates, out of ninety-one names submitted, were named.

Other awards included honorary memberships for Chester W. Wheeler, Rochester, and Eldridge R. Christhilf, Chicago, and five PSA Fellowships, out of twenty-seven names offered, for Dr. John P. Renus, Philadelphia; Paul L. Gittings, Houston, Tex.; L. Whitney Standish, Boston; John H. Vondell, Amherst, Mass., and Franci C. K. Wu, Hong Kong.

The PSA Honors Committee consists of C. B. Neblette, Rochester, chairman; Miss Eleanor Parke Custis, Washington; Frank Fenner Jr., Chicago; Shirley M. Hall, San Marino, Calif.; P. H. Oelman, Cincinnati; Fred P. Peel, Louisville, Ky., and Thomas H. Miller, Rochester, secretary.

Photography Becomes An Art

If Done The Way Harry Shigeta, Chicago Lensman, Does It—Use Chemicals, Dye For Effects, He Tells Convention.

BY JAMES T. GOLDEN JR.

Harry K. Shigeta wanted to be an artist. Artists, you know, don't have to copy nature too closely—they can change the shape of a tree when they paint it, or move a building from one place to another or leave it out altogether, for instance, if they think it makes a more pleasing pictorial composition.

But Shigeta wanted to be a photographer, too. Cameras, however, are machines, and they have to copy what they see. "Why not give the photographer the advantage the painter has?" Shigeta asked himself. So he did.

MATTER OF FORM!

"Most girls with good figures are willing to show them, if the photographer can convince them that his work is artistic," P. H. Oelman, Cincinnati photographer, told the Photographic Society of America's Pictorial Division yesterday. But if the work is not truly artistic, negative and all prints should be destroyed, he said. Oelman said he found that girls he trained himself gave better results than professional models, and that girls between 18 and 22 years have the most beautiful bodies. "When girls realize there is nothing lewd, their resistance disappears," he said.

The Chicago photographer told members of the Photographic Society of America's convention, of which he is a trustee, about the technique before they closed their convention at the Netherland Plaza yesterday.

Shigeta makes a print from his original negative, then alters the print to create the mood and feeling he feels it could best express. He applies a neutral gray dye where he feels deeper tones are necessary—for instance, to darken a foreground object and produce a greater illusion of depth by contrast with a background object that had about the same intensity.

Or areas—the background object, for example—may be made lighter by application of various chemicals, such as potassium permanganate ("If it runs over you needn't worry; you can always darken the lightened areas again with the dye," Shigeta says). Then he puts the positive between two sheets of glass at the front of an illumination box containing a piece of opal glass that diffuses a strong light to shine through the print. Then he takes a picture of the recomposed print.

It's as simple as that. Of course Shigeta admits with a sly grin, his early art training sort of helps out. But it's useful in portraiture as well as with landscape, still life and other subjects, he said, and gives more scope and control than traditional retouching.

"With extremely simple equipment, such as photoflood lamps and peanut flash bulbs, and in your own living room, you can change a picture from a record that pleases you to a pictorial composition that pleases anyone," Harvey P. Rockwell, President of the Rockwell Engineering Co., Indianapolis, told the PSA Technical Section. Rockwell's company manufactures measuring and control instruments, including photographic equipment.

There are two "points of control," Rockwell said: (1) uniform illumination on the subject or purposeful distribution of light for accent, and (2) adjusting illumination for contrast by shading undesirable areas or giving additional light to others to create "modeling, roundness, or separation of various parts."

"In general, the more uniform you can make the lighting the more sure you are to get the result you want," he noted, advising the uniform lighting for beginning amateurs. He compared that style to oriental "notan," composition by patterns of light and dark, and the second control to occidental chiaroscuro, contrast of lights and shadows.

This was an off-year for the PSA's biennial elections, but a number of honors were awarded at the closing dinner in the Hall of Mirrors last night. Charles P. Phelps Jr., Grosse Pointe, Mich., President, was in the chair. Stuart M. Chambers, St. Louis, was toastmaster, and Lajaren A. Hiller, noted New York photographer, principal speaker, related some of his amusing experiences in picture-taking in this country and abroad.

Adolf Fassbender, New York, teacher of photography, received the highest and infrequently bestowed honor of PSA—an honorary fellowship "in recognition of a distinguished career of more than 50 years as a professional photographer, pictorialist, and inspiring teacher." Fassbender became interested in photography before he was in his teens.

Chester W. Wheeler, Rochester, N. Y., and Eldridge R. Christhilf, Chicago, received honorary memberships. The Clerk-Maxwell trophy for the best color print made and processed by a member for the convention exhibition went to Louis Condax, Rochester, N. Y. The Stuyvesant-Peabody Memorial Award for "the man who has done most for pictorial photography in the last year" was won by Christhilf for organizing "American Portfolios," a critical-exchange system of circulating photographic work.

—Enquirer (Kain) Photo

For the first time in several years the Photographic Society of America made its highest award last night. Adolf Fassbender, left, New York, teacher of photography, received an honorary fellowship. C. B. Neblette, Rochester, N. Y., right, Chairman of the Honors Committee, made the presentation. The few other photographers who received the award in the PSA's 29-year history included Frank Roy Fraprie, Dr. C. E. K. Mees and the late Alfred Stieglitz, Henry Jackson and Samuel E. Sheppard.

The convention, representing 8,000 members, had a registration of 700 persons.

THE CINCINNATI POST

Photo Society Convention Opens Here

Radical One-Step Process Camera To Be Demonstrated

Plenty of animated conversation filled the fourth floor foyer of the Netherland Plaza Wednesday morning, but none of it was about the election. At convention headquarters of the Photographic Society of America, any camera could draw a bigger crowd than a candidate.

The PSA convention began Wednesday and will last through Sunday. Most of the convention talk is to be done at the Netherland Plaza. At the Art Museum, a display of 287 prints will demonstrate what the delegates are talking about.

Lecture subjects range from "Latensification Studies With Sodium Perborate" to "How to Start a Camera Club." F. E. Carlson will be there with a radical "One Step" camera: snap the picture, turn a crank, and out comes the finished photograph. And Professor Issy Balinkin, of the University of Cincinnati, will present what has been described as his "three-ring circus" of color photography.

At the Museum, photographs of everything from high-speed shells in flight to the human heart in color will be displayed. Entries came from China, India, England, Canada, South America, South Africa and many European countries.

Everyone Gets His Picture Free

11-5

The 700-odd delegates to the annual convention of the Photographic Society of America, at the Netherland Plaza, settle down to some serious technical discussion Friday.

Many cameras, small and large, were in evidence, and flash-bulbs flashed as the shutter-bugs took pictures of each other.

For the first time a news photographer was not accosted by the familiar "take my picture, mister." He was outnumbered.

Words concerning the intimate details of picture making were flung about with knowing airs in a series of technical meetings relating to color film, processing problems, "photometric calibration of motion picture camera lenses," and "35-mm projection slide service and catalog listing photography."

The meeting will close with a series of exhibits and a visit to the photography show at the Art Museum.

Miss Gerda Peterich, head of the department of photography, Ohio University, Athens, O., explained that her department regarded photography not only as fine-art training but also as a craft which can be combined with other types of work.

WE DON'T KNOW HOW MANY Cincinnati women are interested in photography but there must be quite a number. We mean those who do their own print work and love to work in a dark room, not just those who snap a picture.

We can name less than a dozen, but they are all top-notchers. They are Marion Moore, Edith Poggendick, Jean Shebleany, Edna Douthat, Ida Suttman, Emma Hill Schoth, Annette Oelman, Ruth Mulvey, Florence Carver and Dorothy Gleason.

They are taking an active interest in the Photographic Society of America annual exhibit and convention which will be held in Cincinnati Nov. 3-6.

The convention will open with an exhibit at the Cincinnati Art Museum Wednesday night, Nov. 3. **P. H. Oelman**, widely-known photographer, whose course in pictorial photography we enjoyed at the University of Cincinnati, is general chairman.

There are some 60 speakers on the three-day program including Dr. C. E. K. Mees of the Eastman Research Laboratory; Fred Archer of Los Angeles, who will give a demonstration on pictorial lighting; Eleanor Park Custis of Washington, D. C., artist and photographer, who will talk on pictorial composition, and Gerda Peterich, head of the photography department of Ohio University, Athens.

Charles B. Phelps, Grosse Point, Mich., is president of the Photographic Society of America which is composed of professional and amateur photographers; as nice a group as you would ever want to meet.

Annual Membership Meeting

The Netherlands Plaza Hotel
Cincinnati, Ohio
November 4, 1948

The meeting was called to order at 11:20 A. M. with President Phelps in the chair. With him on the platform were 1st Vice-President Mulder, Secretary Dewey and Treasurer Heller. Well over 150 members were present, the required quorum being 50.

In opening the meeting Mr. Phelps explained that this year the annual Divisional and Committee reports had been published in the October issue of PSA Journal so as to obviate the necessity of presenting them verbally to the meeting and thus allowing the members ample time to express their own views about the conduct of the Society.

Before calling for remarks from the floor, he gave a report of some of the past year's activities as follows:

The total membership in all categories is now 8,337. Members will benefit as the Society grows still larger.

There is a heavy minimum operating expense at Headqaurters which will not rise in proportion to an increase in the size of the Society. With the labor-saving business system now being installed, the present office staff will be able to take care of a much larger membership. Therefore, it behooves every member to bring in others.

MEMBERSHIP COMMITTEE

The enthusiastic new chairman of the Active Membership Committee, Mr. Paul W. Gibbs, of New York, unfortunately could not be here but he has sent the following message:

Fellow Members of the
Photographic Society of America:

Your Committee is now unfolding plans to double the number of PSA members within a year!

To DOUBLE the membership of the Society means more than double services the Society can render to you.

Membership advantages of PSA are to be brought to the personal attention of every photographer that the Society can reach through direct mail, the press, and through personal contacts of present members. Active co-workers of the Membership Committee will be appointed throughout the nation—and specific duties assigned to each so that the Society may attain in number and influence, a membership far greater than heretofore anticipated.

What can you do NOW? Upon your return home, list the names and addresses of all your friends interested in any field of photography (including professionals and dealers) who are not now members of the PSA. Send this list to the attention of the PSA Membership Committee at headquarters in Philadelphia, who in turn will forward to each individual complete information re PSA membership, with an application blank for membership. Secondly, contact all PSA members in your local district who were unable to be present at the Cincinnati Convention and relay to them both the information contained in this letter and the request that they likewise cooperate in this membership campaign.

We are asking you to do something that is both simple and easy to execute, but which is of the utmost importance to the success of membership plans. We know that we can depend upon your help, and promise in return that we will do everything possible to forward the growth of PSA—for you.

(Signed) PAUL W. GIBBS,
Chairman, Active Membership Committee

Mr. Phelps went on to say that the Society will acquire added prestige when it passes the 10,000 membership mark. The Journal will then find it easier to sell advertising, income will be increased, and all members will benefit.

During the past year much of the effort of the Board of Directors has been devoted to digesting the new Constitution and By-Laws which went into effect in October, 1947. This document required the establishment of administrative practices in almost every managerial sphere. As soon as these procedures can be codified, they will be published in the Journal, and the confusion of the transitional period from one set of By-Laws to another will be ended.

Recently, another type of membership, authorized in the new By-Laws, has been instituted. At some of the past Annual Meetings, members have arisen and demanded that the dues be raised from $5.00 to $10.00. There should be no more complaint on that score as now any member has the option of remaining as Active Member at $5.00 or becoming a Contributing Member at $10.00. The Contributing Member simply gives added financial support to the Society, and there are a great many who can afford to do that. On the other hand, there is no desire to work any hardship on the man who can't afford the extra expense. No stigma attaches to those who remain Active Members, as the choice is entirely optional with the individual.

New rules have been established for the Life Membership. The fee remains at $100.00 but the total number is limited to 100 and applicants must be at least 40 years of age. As there are at present 48 Life Members, 52 vacancies remain.

The Society has, during the year, received a number of gifts for the PSA Library and Historical Collection. Recently, the Library acquired, by purchase, a fine set of "Camera Work," by the late Alfred Stieglitz, Hon. FPSA.

The Permanent Print Collection is growing steadily. It is being catalogued and presently members will know what a fine collection they have.

The obituary list since the last Annual Meeting was read.

The present Board of Directors is much larger than it was under the previous By-Laws. Now there are some 33 Board Members. Eight meetings have been held during the year in several different cities of the east and mid-west. Many Board members travel at their own expense and deserve great credit for their loyalty. The average attendance at Board Meetings has been 10. It is regretable that six members of the Board did not attend a single meeting.

One noteworthy achievement of the year was the inauguration of the National Lecture Program. Mr. P. H. Oelman, FPSA, made a highly successful lecture tour in the mid-west and far west under PSA auspices. The response from the membership was gratifying. More lecture tours are planned for the near future, with a view toward extending direct PSA benefits throughout the length and breadth of the land.

In concluding this review of the past year, the President read the membership figures for the various Divisions: Pictorial—3224, Color—1236, Motion Picture—502, Photo - Journalism—480, Technical—430, and Nature—284. Members with no Divisional affiliations—4208.

He then asked 1st Vice President Mulder to take the chair to call for any business from the floor.

PSA JOURNAL

The first speaker was Mr. Thomas H. Miller, APSA, of Rochester, New York. He stressed the interdependence of the membership and publication committees and also said that in order to obtain important technical papers for the PSA Journal, a better system must be developed for publishing the available papers more promptly, before their contents cease to be of news value.

Mr. John I. Crabtree, FPSA, of Rochester, New York, was the next speaker. He deplored the present policies of PSA Journal and voiced the opinion that material of permanent value, of interest to posterity, should make up the main portion of PSA Journal and that the Journal staff could employ its time to better advantage in seeking to build up a larger membership than in soliciting advertising.

Mr. Fred P. Peel, FPSA, of Louisville, Ky., spoke in reply to Mr. Crabtree in favor of the present Journal policies and was warmly applauded.

Dr. E. P. Wightman, FPSA, of Rochester, New York, spoke in favor of more prompt publication of current papers in the Journal.

Mr. Charles Heller, APSA, Treasurer, presented figures to show that last year's Journal cost the Society a total of $14,000 in spite of an advertising revenue of $56,000.

Mr. D. Ward Pease, APSA, of Winnetka, Ill., seconded by Mr. B. Erle Buckley, APSA, of New York City, moved for a vote of confidence in the PSA Journal on its present lines. A vote was called for and Mr. Pease's motion was carried.

Mr. Herbert Howison, of Berea, Ohio, asked that thought be given to the cost of the Journal per number in relation to the membership dues. Mr. Crabtree made further comments on the same subject.

Chairman Mulder next recognized Mr. John C. Noonan of Sioux Falls, South Dakota. Mr. Noonan suggested that camera clubs might be greatly helped if they could get lectures in the form of lantern slides, with comments, when lecturers were not able to visit them.

Chairman Mulder called upon Mr. W. E. Chase, APSA, who is organizing the National Lecture Program, for comments. Mr. Chase said he hoped that the National Lecture Program could be extended to many points where lecturers are not now available, but if that were not possible in every case, he would be glad to try to work out something on the lines suggested by Mr. Noonan.

Mr. Charles A. Kinsley, of Rochester, N. Y., also spoke in favor of extending the National Lecture Program to small clubs and pointed out some of the past difficulties in obtaining suitable educational films.

Mr. Isadore A. Berger, APSA, of Detroit Council of Camera Clubs, called attention to the speakers bureau maintained by his council.

Mr. Dana E. Kepner of Denver, Colorado, suggested that Headquarters should acknowledge the donations of Contributing Members, and the Chairman promised to call his suggestion to the attention of the Contributing Membership Committee.

Dr. E. P. Wightman, then mentioned

proposals he expected to present for amending the Constitution and By-Laws in regard to the methods of electing the representatives to the National Council and also suggested that national ballots should include pertinent information about the candidates.

NOMINATIONS

Mr. B. Erle Buckley, APSA, of New York City, Chairman of the PSA Nominating Committee, went into detail in telling how the candidates were selected for nomination and in justifying the methods used by his committee. He advised against any changes in nominating procedures.

Dr. Wightman spoke again in favor of having more information about candidates on the ballots and Mr. H. M. Howison read a letter written to him by another member which was sharply critical of the ballot procedure.

Mr. H. Lou Gibson, APSA, of Rochester, N. Y., a member of the Nominating Committee, spoke in favor of putting information about candidates on ballots.

Past President Col. Frank Liuni, Hon. PSA, of Richmond Hill, N. Y., appealed to members to encourage young photographers, either within or outside of the Society, to enlist in the photographic units of the U. S. Army Reserve.

Chairman Mulder called upon Mr. Don Loving, FPSA, of Indianapolis, Ind. Mr. Loving began by saying that he spoke as a $5.00 member; that he represented no one but himself; that he is not an official or member of any committee. He spoke at some length on the need for broadening Divisions so that they will care for all the diversified interests of the members. He suggested that new Divisions might be necessary to accommodate members with interests not included in existing Divisions and that no member should be forced to join a Division in which he has no concern, in order to take part in activities which are of particular interest to him. Mr. Loving encouraged the development of Divisions so that they might, if necessary, publish their own papers and assess fees in proportion to the services they render. He concluded with a plea for further development of the Society through specialization of Division activities.

At this point President Phelps resumed the chair to thank the members who had contributed to the New Headquarters Fund. He reported that 532 members had to date donated $2921.00, or nearly three-fifths of the goal of $5000.00. He said a large number of small donations were to be preferred to a few large ones, because they indicated wide support. He expressed confidence that the goal would be speedily reached because so many members were yet to be heard from.

Mr. Phelps said he did not wish to close the meeting until every member who wanted to speak had had an opportunity to do so.

Mr. Walter Pietschmann, of Detroit, then spoke briefly on the current effort to unionize Detroit photographers and the possible danger to amateurs of restrictive legislation.

Mr. Walter E. Parker, of Chicago, presented to the Society the greetings of Mr. Gordon C. Abbott, FPSA, Honorary Representative to Mexico, who was prevented by illness from being present.

President Phelps stated that the Honorary Representative to Cuba was present, Mr. Angel de Moya, who had come all the way from Havana. Mr. de Moya stood up, amid hearty applause.

As there was no further business, the meeting was declared closed at 12:45 P. M.

Annual Meeting of the NATIONAL COUNCIL

The Netherlands Plaza Hotel
Cincinnati, Ohio – November 5, 1948

Present were:

The National Officers

Charles B. Phelps, Jr., John G. Mulder, Mrs. Anne P. Dewey, Charles Heller.

The Divisional Chairmen

Frank E. Carlson, Clifton C. Edom, Burton D. Holley, Harris B. Tuttle.

The District Representatives

District No. 1, Paul A. Sperry; District No. 2, Mrs. Mildred Hatry, John H. Magee, Alfred Watson, Cyrus A. Yarrington; District No. 3, Mrs. Caryl Firth; District No. 4, Earle W. Brown, Dr. C. J. Marinus; District No. 5, Hugh Montgomery; District No. 6, Miss Jane Shaffer; District No. 7, Vincent H. Hunter, D. Ward Pease, William V. Sminkey, Sewell P. Wright. The *8th*, *9th* and *10th* Districts were not represented.

The Chairmen of Standing Committees

B. Erle Buckley, W. E. Chase, H. M. Howison, Donald Jameson, John H. Magee, Walter S. Meyers, C. B. Neblette, P. H. Oelman, Fred P. Peel, C. C. Ruchhoft, C. W. Wheeler.

The Past Presidents

Col. Frank Liuni

The Honorary Representatives

Angel de Moya of Cuba.

The meeting came to order at 11:15 A.M. with the President in the chair.

The roll was called and it was found that 34 Council Members were present out of the 70 who were eligible to take part. The presence of one fourth of the Council Membership constitutes a quorum.

The Council Members were seated in the central portion of the hall while a large audience of spectators sat on either side of them.

President Phelps read the notice dated October 18th 1948, mailed to all Council Members, which included the date, time and place of the Annual Meeting.

He then addressed the meeting as follows:

"This new policy-making body of the Society is holding its first proper meeting. The Council held a perfunctory meeting at the Oklahoma City Convention last year, as a matter of form. However, it was necessary to hold an election before this body could function in accordance with the new By-laws.

"The District Representatives have now been duly elected by ballot of the membership and the Council is ready to do business.

"We have assumed that the national officers of the Society will act as officers of the National Council and they will do so in lieu of any other arrangement.

"I asked in the notice of this meeting that District Representatives be prepared to bring forward any business pertinent to the interests of the members in their Districts and later in the meeting they will be called upon.

"The PSA National Council, you know, is like the General Assembly of the United Nations, it gives advice on policy and procedure; it has no power to put any decisions into effect, but it is a guide to the Board, which is the managing body of this Society. It also has important powers in amending the By-laws. (President Phelps read Section 1, Article VIII of the By-Laws.)

"It follows that this body should confine itself principally to discussions of policy. The Board is anxious to get reactions from the membership through its elected representatives. We want and expect these District Representatives to put the best interests of the whole PSA foremost.

"I know there are some who feel that groups within the Society should be represented here. However, under our present By-laws, we can look on our problems primarily as PSA problems and not as problems of any single part of the Society.

"We've run along fairly smoothly for the last three years, and I put down most of our success to the fact that we haven't had any major strife within the Society. Naturally, human nature doesn't change and there will be flare-ups here and there. On the whole, we've kept a harmonious relationship between all parts of this Society, which I sincerely hope we can continue to do.

"After these preliminary remarks, I will call upon Treasurer Heller to open the discussion of a permanent PSA home. Neither Mr. Philip Cass, head of the Permanent Home Site Committee, nor Mr. Stubenrauch of Philadelphia, Chairman of the Headquarters Committee, has been able to come out here, but they've delegated Mr. Heller to represent them. Also, I will call for comments from members of the Home Site Committee who are here and from other members of the council.

"Until we get a permanent home that will be the focal point for this national organization, we expect to maintain our Headquarters on a purely temporary basis. We want a home we can be proud of. Mr. Don Jameson, Chairman of the Standing Committee for the Endowment and Permanent Home Fund, is ready to go out and raise some money. We hesitate to ask our members for money until we know what kind of a home they want, and where it's going to be. We want to make as much progress as we can this morning to find the answers to those questions."

Mr. Charles Heller reported on the investigations which have been underway in Philadelphia to locate a suitable home for the Society. He posed the following questions: "Will one headquarters building be sufficient in the future? Should our plans embrace having regional offices throughout the country, as well as a headquarters? Will the permanent headquarters be considered as strictly a business office and nothing else? Where is the Journal going to be housed in the future? Are Headquarters and the Journal going to be together or are they going to remain separated?"

Mr. Heller explained that moving from the present location would involve personnel problems, as the trained personnel in Philadelphia have indicated that they prefer to remain there. In moving to another city, new personnel would have to be employed and trained.

The cost of moving and the installation of business machines was estimated at between $2,000 and $3,000 within a 1,500 mile area.

Mr. Heller described an available building, at 2005 Walnut Street, Philadelphia, as suitable for a permanent headquarters; it is three blocks from the present location in a desirable neighborhood. The building is a private dwelling of four stories, brick construction, with 4,100 square feet of floor space, and has a smaller annex at the rear which could be rented to a tenant.

The building has been recently renovated and would need little alteration. The installation of electric wiring appears to be the only item of major consequence. The price of the property is $35,000.

A second residence building, at 2919 Spruce Street in Philadelphia, was described. It is four blocks distant from the present headquarters. The location is considered to be less desirable than that of the present premises. The building is fairly roomy but would require extensive alterations. The price for this property is $19,500.

Mrs. Mildred Hatry of the 2nd District asked if it was intended to use the proposed headquarters building as office space only, or if it was also planned to hang exhibitions there.

President Phelps explained that one of the purposes of the present discussion was to decide whether the Society wanted a permanent home with club rooms and an exhibition gallery, or just office space. He said that no conclusions had yet been reached.

Mr. Walter S. Meyers, a member of the Home Site Committee from Rochester, suggested that it should be decided whether or not the Society is to be run for the benefit of the Philadelphia personnel or for the benefit of the Society. He explained that a large mansion in Rochester, New York, had been offered to the PSA earlier in the year but that, because of delay in securing Board approval to acquire the property, it could no longer be had.

Mr. Meyers expressed the opinion that similar property could be found in almost any section of the country.

Colonel Frank Liuni asked if a comprehensive study had been made as to what office and floor space is needed with or without the Journal staff accommodated in the same location. He inquired as to whether any thought had been given to the requirements of the Society when it has as many as 15,000 or 20,000 members. He felt that a great deal of information was needed before a decision could be reached in determining what type of headquarters is necessary for present and future requirements.

Colonel Liuni also inquired about plans for hiring an Executive Secretary capable of performing com-

plex duties in connection with a permanent home. He suggested that the job should not be assumed by a committee which, of necessity, would be changing from year to year.

President Phelps: "Well, Colonel Liuni, Mr. Cass's Committee did go into the matter of required office space. An estimate was made. I haven't that with me, and I don't know whether Mr. Heller brought it out with him or not."

Mr. Heller said that the estimate was for between 4,000 and 5,000 square feet.

Colonel Liuni: "That's the present requirement?"

President Phelps: "Those are minimum requirements for office working space alone. That doesn't include any Journal office, exhibition room or anything else."

President Phelps explained that the Board wanted to have a member, who is an architect, volunteer to prepare tentative floor plans for a PSA Home, but none volunteered. He presumed it would be necessary to employ a professional architect, when it is learned what accommodations the members desire.

Mr. D. Ward Pease, of the 7th District, expressed the opinion that it would be unwise for the Society to spend money for exhibition purposes when such space can be had in museums and other public buildings and would only be needed by the Society occasionally.

Mr. Pease stated he felt that for several years the headquarters should be confined to space which will be in continuous use as offices, etc.

President Phelps said he felt that when we acquired a permanent home it should be on a much larger scale than just an enlarged office space.

Miss Jane Shaffer, of the 8th District, suggested that thought be given to starting out with permanent space for general offices and the Journal and then later on developing regional offices throughout the country to serve outlying areas.

President Phelps replied that he had heard no previous discussion of regional offices. He stated that the Pictorial Division had received the Board's permission to establish a workroom in Chicago but that it hadn't been done as yet.

He further explained that the Permanent Home Site Committee had been organized, with members in five different cities, with the view of obtaining the sentiments of members in those cities concerning the location of our home. Washington, D. C. has been ruled out because of the local members' lack of interest and the fact that the federal government may commandeer premises in the District of Columbia at any time.

President Phelps suggested that it might be wise to consider sites where property values are not high and the buildings available are more attractive than in the center of the big cities. He suggested the suburbs of Philadelphia as an example.

Mr. J. P. Wahlman, a member of the Home Site Committee, advised that the membership in the Chicago area feels that the headquarters should be in Chicago because of its central geographical location. He stated that efforts have been made to locate suitable space but that no definite action has been taken since it was not known how much money the society was prepared to spend.

Mr. Wahlman said that there were several benefactors in Chicago who are prepared to make substantial donations to the Society. He suggested that certain rooms in the headquarters be known as "memorial rooms" named for individuals, and he added that such a move would be an inducement to those who are interested in donating sums of money to finance the purchase of a building.

In addition, Mr. Wahlman pledged the continued support of the Chicago membership in locating suitable buildings for a headquarters. He also said that they would not be in much of a position to help until they knew what the Society's wishes were along these lines.

Mr. Fred P. Peel: "Shall the national headquarters be simply an office for handling the business affairs of the Society and the Journal, or shall it be a building with a lot of space that will only be used occasionally for exhibit purposes, memorial rooms, and so forth?"

President Phelps replied by saying that the sentiment of the group might be arrived at if Mr. Peel rephrased his question in the form of a motion, but that he felt there should first be more general discussion on other phases of the project.

Continuing, President Phelps said that action could have been taken by the Board of Directors previous to the Convention, but that nothing definite had been done because it was felt that the choice of a Permanent Home Site was such an important step that it should first be brought before the whole membership for its approval.

President Phelps called upon Mr. C. B. Neblette, a member of the Home Site Committee, for comments. Mr. Neblette said that he felt Mr. Meyers had covered the subject adequately and he had nothing further to add.

Mr. S. P. Wright, of the 7th District, pointed out that the discussion so far had been confined to the premise that the society was going to buy a "ready-made property." He argued that although construction is still an expensive proposition, it might be a good idea to have a small building designed and built which could be added to as the Society grows larger. Such expansion could later on, he explained, embrace club rooms, exhibition galleries, etc.

Mr. H. M. Howison requested that the consensus of opinion be determined as to the best geographical location for the headquarters, and he indicated that he agreed with Mr. Wahlman that the headquarters should be located near the geographical center of population. He stressed the fact that a headquarters so established would reduce the costs of the photographic activities, travel and shipment of prints.

President Phelps: "You might incorporate that suggestion into a motion."

Mr. Howison: "All right. I'll make a motion that a headquarters site be considered, in the territory bounded by Chicago, Cincinnati, Rochester and Detroit."

Mr. Harris B. Tuttle: "I second the motion."

Mr. Cyrus A. Yarrington—of the 2nd District: "I'm from New York, and if the national office is only to be a business office it could be in Seattle for all I care. Now, unless you're going to make it into a place where you're going to hold your annual conventions, then it doesn't make any difference where it is."

Mr. Donald Jameson: "Well, I think that as for geographical location we're putting a little too much importance on that phase of it. We have airplanes now. In other words, I can get to New York in four hours and Chicago in an hour, and so on like that. So I think we ought to pick out a few good towns like Rochester, Chicago, Philadelphia or New York and decide on one of them."

Mr. Pease: "I agree with Mr. Jameson in general that the distance is of minor importance. Still I think that the motion has a good intent. If I were wording it, however, I would put it this way: In the vicinity of Chicago, Rochester or Philadelphia; and as things stand, Philadelphia is excluded from consideration by that motion."

President Phelps: "That is so. Mr. Howison, would you consider amending your motion?"

Mr. Howison: "To include Philadelphia?"

President Phelps: "Well, broadening it at least."

Mr. Howison: "The answer is no. If the headquarters were somewhere near the geographical center of the United States, I think it would eliminate a lot of the difficulty that we now have in getting a large attendance at Board meetings.

President Phelps: "As a matter of fact, the Chicago meeting this year was the most poorly attended Board meeting we had. However, if we had a permanent home, undoubtedly it would be a center for all Board activities."

Mr. Meyers: "Well, I think if we are planning to make this headquarters purely a business office, we should continue to rent and stay where we are. If we're going to make a future home for the Society, let's wait until the Society has grown sufficiently so that we know what kind of a home we need and then pick out where we want to establish ourselves."

President Phelps: "Well then, the question seems to be whether this motion should be voted on now or postponed until we decide what type of place we want."

Mr. Pease: "Mr. Meyers anticipated something that I was about to say. We have been talking about the possibility of future expansion. Mr. Wright said, 'Let's have an architect design a building.' If we purchase a readymade building, we are pretty much set; and if we don't want to buy and take care of the situation well into the future, we're rather in a quandary. The present cost situation encourages renting and continuing the status quo for a while. It occurs to me that rather than renting a residence, such as the present headquarters which is rather inflexible we might consider getting into an office building where, as the organization grows, it can be expanded into adjacent offices."

President Phelps: "Of course, those are rental details that can be settled by the Headquarters Committee. I don't want to get into too many ramifications now."

Mrs. Hatry: "I understand that a PSA Home would be a tax free building because it's used for educational purposes. If you just rented an office building, how would that affect it? I think if we're going out to raise money for a permanent home for the PSA, certainly it should be a tax-free proposition. That might appeal more to a number of people in the Society who have money."

President Phelps: "The motion before the meeting is, where it shall be. If you want to discuss what sort of headquarters it shall be first, Mr. Howison must agree on postponing his present motion."

Mr. Howison: "My purpose in this motion was simply to get the sense of this group as to location. That was the only purpose I had in putting the motion before the group."

President Phelps: "Well, there seems to be some question as to whether we shouldn't first consider the matter of the type of building before we talk about the location."

Mr. Howison: "It would seem to me that a decision on the type of building can come only after a committee has given adequate study to the question. First we've got to locate ourselves somewhere in the United States. Then we've got to decide what kind of a building or what purpose this headquarters building is to serve, whether it's to be merely a business office, to which the members necessarily will never come, or whether it's to be a business office plus something else. I think we should first get the sense of the group as to the best area for our permanent location."

Colonel Liuni: "It seems to me that the motion on the floor is biased. Mr. Howison prefaced this motion by locating the site somewhere near the population center and stating that we would reduce the cost of operating the Society. Maybe you'd save a few dollars on postage and things of that kind, but aside from that I don't see that it has any bearing on the question. I don't think the amount to be saved should govern the location. For that reason I'm opposed to the motion. I think we should have a much grander scope to our ideas than the saving of a few dollars on operating expenses."

Miss Shaffer: "I think the ideal solution is, without question, to have a space that can take care of the needs of exhibits and other things rather than a straight business office. Are you going to locate your office from a business point of view pure and simple, or are you going to locate it with the idea that your members throughout the country may be drawn closer to the National Society through the opportunity of visiting the national headquarters for meetings, directors' meetings, and conventions? I think that is the important thing to be decided and it will have an important bearing on your locality."

President Phelps: "This discussion could be continued indefinitely. Unless there is an objection I would like to take a vote on the motion."

Mr. P. A. Sperry, of the 1st District: "I'd like to make a motion that Mr. Howison's motion before the assembly be tabled for the moment until we can learn what kind of a headquarters we can acquire."

President Phelps: "I think I will have to call for a vote on Mr. Howison's motion first. Will you repeat your motion, Mr. Howison?"

Mr. Howison: "My motion was: that the location of the Society's headquarters be somewhere near the center of population of the United States, and I mentioned for the boundary lines the area between Chicago, Cincinnati, Rochester and Detroit."

President Phelps: "Mr. Howison's motion, as stated, would completely eliminate the East Coast, as I understand it. In voting please remember that it is merely to record the sentiment of this meeting. The result is not binding on the Board. I think that one of the main purposes of a discussion like this is to get the views of the National Council into the Journal. Although this is a representative group, it is relatively small and we want the whole membership to know about the Society's problems."

The vote was taken and Mr. Howison's motion was defeated.

President Phelps: "Now, I think we can profitably discuss the other point, the type of building. Would someone like to continue that discussion? Shall it be just a business office large enough for future expansion, or should it be something more?"

Mr. Peel: "I move that, for the time being, the premises to be considered for the national headquarters shall be purely of the business office type."

President Phelps: "Is there a second to Mr. Peel's motion?"

Mr. Pease: "Second the motion."

Colonel Liuni: "I think the motion is really out of order because the question before the house is what shall the permanent headquarters of the Society be, and you reply that the 'national headquarters' be such and such. What should the permanent headquarters be? That's the question."

Mr. Peel: "For the time being."

President Phelps: "I think Colonel Liuni's point is well taken. I know what Mr. Peel means but we are really discussing the matter of a permanent headquarters rather than something on a temporary basis. Would you like to withdraw that motion, Fred?"

Mr. Peel: "Sure, I'll agree."

President Phelps: "I'm sure that this thing is not going to be settled right away. We'll probably carry on just the way we are for quite a while. But what we want to know is on what basis are we going to raise a fairly large sum of money for a permanent headquarters."

Mr. Sperry: "I'd like to offer as a suggestion that we have a working space adequate to handle double or triple the present membership. As a suggestion, this office could be headed by an adequately paid manager directly responsible to the President. I personally do not believe the location of headquarters of any great importance to the membership of PSA at large. And I use the present convention as a basis for that statement, as I believe there's roughly ten per cent of the PSA membership present."

Colonel Liuni: "I hate to monopolize this discussion, gentlemen, but I have a very deep feeling about this subject. As many of you know, I had a great deal to do with the early days of the Society. And I want to tell you that those of us who sweated (and I don't mean that figuratively but literally) had great dreams; we still have them. And we're looking forward to you who are now in the Society and those who are going to come along with us later to make those dreams a reality. Now, those dreams didn't envision only a place where the clerks could do their daily chores. We saw a place where the Photographic Society of America would be a visual symbol to the whole world that photography is something real and vital, something which has ramifications in all phases of our civilization, and a place where we could show, by actual demonstration, by putting on exhibitions not only for our members but for the world, what our Society was and what photography was and could do.

"That's the kind of headquarters I'd like to see the Society have, and I think that's the kind of headquarters most of you would like to have the Society have. I think you will agree that while we had our great dreams, while our heads were in the clouds, we kept our feet on the ground. If we hadn't, we wouldn't be here today. We still have our feet on the ground. But we still want to continue to dream, and I want you to dream with me and with those of us who started this thing and make that dream come true. But dream big things; don't dream little things."

President Phelps: "Well, Mr. Sperry, I think your suggestion was more along the phase of current management than a long range policy for the future. We've got fairly adequate working office space now and we have a capable manager, and we shall continue to run our office on a business-like basis; but a permanent home is a much larger matter than just an office space. If we just had the problem of adequate office space, we wouldn't need a general discussion by the whole council. We must

raise money for a much bigger project if we're going on to have a good program for the future."

Mr. Wright: "It seems to me that the discussion could go on indefinitely if we don't make some plans more or less on what type of place we should have. I'm in complete agreement with the idea of having big dreams. But those dreams have to start with the realization of small dreams. And if we consider the purchase of large property now or property of any size now, that by itself is going to be too large for us at this time or too small for us, we hope in the quite near future. So I believe the idea of having plans made for a place which will grow as homes grow, as the family increases, is the logical attack to the problem, rather than purchasing the property already made and therefore almost completely inflexible. And I would like, if it will expedite the clarification of our ideas on this subject to make a motion to the effect that our thinking be directed toward the idea of acquiring land, and getting an architect's drawings on a building which will expand as the Society grows."

Miss Shaffer: "I'll second it."

President Phelps: "Is there any discussion on it?"

Mr. Jameson: "Well, I think that sounds very nice, but I think it's going to cost so much more for the building that we'll never get it done. Why don't we get some fine old house? Because if we don't, we're going to wait around here and get some plans and we'll find that it's going to cost a couple of hundred thousand dollars to build something."

President Phelps: "Of course, it might be possible to combine the two ideas; buy property already in existence with space to build additions onto it."

Mrs. Hotz: "Personally, I think a suburban neighborhood would be very wrong. I think if you're going to build a building and you decide that it costs you $200,000, by the time you get it built it's going to be a minimum of $400,000."

President Phelps: "Mr. Wright, will you please repeat the motion?"

Mr. Wright: "The motion is to the general effect that we recommend the consideration of the idea of making plans and building a home for the Society which would be capable of growing as the Society's needs increase and could be enlarged to enable the Society to realize those dreams that we all have regarding this Society's future. And in defense of my motion and some of the comments made on it, it seems to me that we must consider more than the initial cost which has been mentioned, because the cost of maintaining a new property is so much lower than the cost of remodeling, painting and maintaining an older property. There is much in favor of the new property designed especially for our (I think we can probably say) peculiar requirements." The question was called for. The vote showed ten votes in the affirmative and more than ten votes in the negative.

President Phelps: "The motion is lost."

Mr. Pease: "I just wanted to ask what is the general relationship between the time yet available to us in this meeting and the things still to come before it? Let's have a comment on that."

President Phelps: "There's some more business but I intended now to give all the elected District Representatives a chance to signify whether they have any business to bring up or not. The notice of the meeting stated that they were requested to bring before this meeting anything of interest from their Districts. I know that one District Representative does have some business, and I think inasmuch as our time has gone so fast that I'll call for that business right now. Miss Shaffer."

Miss Shaffer: "Mr. President: St. Louis is inviting PSA to hold their 1949 Convention in that city. I have been asked by the Camera Club Council of St. Louis to present that invitation to our President. I have brought with me a book, 'St. Louis Invites the Photographic Society of America,' including letters from our Convention Bureau, our Mayor, our hotels, as well as our Council. And so I take great pleasure in inviting the PSA to come to St. Louis in 1949." (Applause)

President Phelps: "I thank you, Miss Shaffer. Early this month I received information on this subject by letter from the President of the St. Louis Council, which I acknowledged with thanks, and I informed him that it would receive careful consideration. We have a Standing Committee on Conventions which goes into these matters. I'm going to turn the invitation over to this Committee which will be asked for a prompt report to the Board of Directors. Now, I want to see if there are any other representatives that have business to bring before this meeting so that we can decide how long we can stay in session. If there is no further business from the Districts, of course, we have a great many matters of general policy of the Society which could profitably be discussed here."

Mr. Jameson: "I move we adjourn."

Colonel Liuni: "I second the motion."

By unanimous assent the meeting was declared closed by the President at 10:30 P.M.

OFFICIAL NOTICES

The Annual Meeting of the Board of Directors of the PSA was held on Wednesday, November 3, 1948 in the Netherland Plaza Hotel, Cincinnati, Ohio. Present were: Mrs. Dewey, Miss Weber; Messrs: Carlson, Christhilf, Edom, Hall, Heller, Holley, Howison, Jameson, Liuni, Magee, Meyers, Mulder, Neblette, Oelman, Peel, Phelps, Ruchhoft, and Tuttle. In attendance by invitation were Messrs.: F. R. Archer, G. W. Blaha and G. E. Matthews.

President Phelps was in the chair and Mr. Holley acted as Secretary of the meeting.

The financial report for September 1948, as circulated to Board members by mail, was approved.

The Board agreed to request the Active Membership Committee to review the list of members delinquent in the payment of dues and to report to a future Board meeting the action taken and the results.

The President read a letter from Chairman Paul W. Gibbs presenting his plans for active membership solicitation.

The Finance Committee was requested to make an analysis of the cost of obtaining new members, of holding existing members; the worth of new members to the Society, including the effect of the efforts of various Divisions; and to report its findings to the Board of Directors.

The Minutes of the October 1, 1948 meeting of the Board were accepted as previously circulated to the Board by mail.

The proposed By-laws of the Photo-Journalism Division, prepared by Mr. Edom and reviewed by the By-laws Committee, were read, revised and approved.

Mr. Phelps reported that Mr. J. Akkerman of Rotterdam, Holland, had accepted the appointment of PSA Honorary Representative to the Netherlands and had sent greetings to the Convention. He also reported that Mr. Angel de Mova, of Havana, had accepted the appointment of PSA Honorary Representative to Cuba and was on his way to Cincinnati for the Convention.

It was ruled that remission of dues should be a privilege of anyone holding the title of Honorary President of the Society.

It was ruled that the duties of the Nominating Committee be enlarged to require preparation of brief descriptive data of all nominees including address, occupation, age, length of membership in PSA, Divisional Affiliation. This information should be sent out on or with the ballots by the Elections Committee.

It was also decided to inform the Nominating Committee that the Board believes it desirable, where practical, to nominate more than one candidate for each national office; and feels it is essential to nominate more candidates than required, to fill Directorships and other elective offices.

With the Society's future success in a large measure dependent on the choice of the slate of national officers to be chosen in 1949, the Board discussed possible ways of cooperation with the Nominating Committee in order to give the committee the full benefit of the Board's experience. To this end it was agreed that the Nominating Committee be directed to submit, for the information of the Board of Directors, its tentative slate of nominees, five months in advance of the election date.

Mr. Phelps expressed keen pleasure in having with the Board two members from the Pacific Coast and called upon Messrs. Fred Archer and Shirley Hall for any remarks they cared to make to guide the Board in far-west relations. Both agreed the the PSA was held in high esteem in their state and that the western members understood the obstacles which great distances place in the way of closer contacts.

The report on Medical Portfolios dated August 25, 1948, made by the temporary committee of Messrs. Ray Miess, Chairman, Stuart M. Chambers, and Dr. Max Thorek was read. Also all the correspondence on this subject which took place between President Phelps and Mr. Don Loving during the past four months was read. After discussion, the Board agreed that the report of the Temporary Committee on the Medical Portfolios be accepted; that the committee be discharged forthwith with thanks; and that Mr. Don Loving be notified of the action taken. As a result of this decision by the Board, the present status of the Medical Portfolios will remain unchanged.

The meeting which was opened at 2:45 P. M. was declared closed at 5:30 P. M. *Second Meeting.*

The Second Meeting of the Board of Directors was held on Saturday, November 6, 1948 in the Netherland Plaza Hotel, Cincinnati, Ohio.

Present were: Mrs. Dewey, Miss Weber, Messrs.: Chambers, Chase, Christhilf, Hall, Heller, Holley, Howison, Jameson, Johnson, Liuni, Magee, Mulder, Neblette, Oelman, Peel, Phelps, Ruchhoft, Standish, and Wheeler.

In attendance by invitation were: Mr. G. Blaha and members of Honors Committee. Miss Weber acted as the Secretary of the meeting.

Mr. Phelps asked for approval of appointments to the new Progress Medal Committee: Mr. Donald McMaster, FPSA, Chairman, Rochester, N. Y. Members: Messrs. P. H. Oelman, FPSA, Honors Committee, Cincinnati, Ohio; F. P. Peel, FPSA, Special Awards Committee, Louisville, Ky.; J. M. Bing, FPSA, New York City; Dr. R. R. McMath, FPSA, Pontiac, Mich. The appointments were approved by the Board for one year terms.

The invitation issued some months ago to the PSA to join the International Federation of Photographic Art was again considered and fully discussed. Letters on the subject from Messrs. J. M. Bing and F. R. Fraprie were read to the Board. Mr. L. Whitney Standish, Chairman, read the report and recommendations prepared by the International Relations Committee. Mr. Holley gave the views of the Pictorial Division. The Board agreed to ask President Phelps to write a letter to Dr. Van de Wyer of Antwerp, Belgium, thanking him for the invitation and expressing regret that other responsibilities do not allow participation of this Society at this time.

After a discussion of the future international policy of the PSA, it was agreed to appoint Dr. Maurice Van de Wyer of Antwerp, PSA Honorary Representative to Belgium.

Treasurer Heller presented to the Board opinions of legal counsel on the Society's financial responsibilities for its Chapters and Divisional Sections. He also read a summary of the terms of the Society's Blan-

ket Comprehensive Liability Policy with non-ownership public liability and property damage.

Mr. Stuart Chambers, Chairman of the Chapters Committee, gave a brief history of PSA Chapters and remarked that the Chicago, Columbus and Seattle Chapters were the only present survivors. He made recommendations for changes in Chapter status.

After full consideration it was agreed that due to legal difficulties, and upon the advice of counsel, the charters of all existing PSA Chapters would be rescinded by the Board of Directors as of February 1, 1949.

It was decided to direct the Chapters Committee to suggest to existing Chapters that they may reorganize as organizational members of the PSA.

The Board of Directors passed a motion to amend the Constitution and By-laws of December 1946 by eliminating therefrom, Article XIII, entitled, "Chapters."

Problems in connection with Divisional Sections were not discussed.

The Board's annual review of the practices, rules and regulations of the Honors Committee was held, with seven of the eight members of that Committee temporarily in attendance. Mr. Neblette read a report of the committee's work during the past year and a comprehensive memorandum of tentative recommendations for rules and regulations to govern future policies which had been drawn up at a meeting of the committee held on the previous day. He said that these rules and regulations would be put into final form under the direction of Mr. Oelman, the new chairman-elect. Instructions to applicants, the requirements for the various types of Honors and other pertinent data for the information of the membership would be amplified, clarified and published as soon as possible in the PSA Journal.

The Board thanked the Honors Committee and voted it a budget of $300.00, exclusive of printing costs.

Mr. Frank Fenner, Jr., suggested that the Society prepare and sell PSA photographic calendars illustrated with photographs of salon quality. The Board was interested in his suggestion and agreed to make a study of its possible applications.

Mr. L. Whitney Standish told of his work on recommended standard salon practices, under the auspices of the PSA Exhibitions Committee. He had been in touch with Mr. F. R. Fraprie on this subject but was not prepared to make a report as yet. After a conference with Mr. Frank Carlson, Chairman of the Technical Division, it was agreed that no jurisdictional conflict exists with the Standards Committee of the Technical Division over standard salon practices.

An invitation from the Camera Club of St. Louis, Missouri, to hold the 1949 Annual Convention of the Society in St. Louis next October was discussed and accepted.

After considering alternative proposals, the Board agreed that the Camera Club Council of St. Louis should conduct the 1949 PSA Exhibition of Photography in connection with the 1949 Annual Convention of the Society.

A gift of $50.00 from Mr. Joseph M. Bing for the purchase of a PSA banner was accepted with hearty thanks.

The President produced the official minute books of the Board of Directors for the inspection of the Board.

The Board directed the Headquarters Committee to buy a proper safe for protecting the Society's documents at Headquarters against fire and other risks, at a price limited to $1000.00; to rent vault space for other valuable possessions of a more bulky nature; and to act with dispatch.

The President stated that in addition to the two Board meetings just held in Cincinnati he expected to call Board meetings during the remainder of his term, in Chicago, Cleveland, New York City, Philadelphia and Rochester. The Board approved this arrangement.

The meeting which was opened at 9:30 A. M. was declared closed at 1:45 P. M.

News and Notes

In addition to those donors previously listed in PSA JOURNAL, the following have contributed to the New Headquarters Fund:

Adams, Harold W.
Abers, Raymond F.
Allen, Ted M.
Anderson, Raymond E.
Anonymous
Antonelli, Severo
Apfel, Hugo L.
Austin, Wallis
Arbing, B. H.
Bailey, William W.
Barrett, Timothy A.
Benus, Dr. John P.
Blaurock, Carl
Bostock, Edward C.
Brigham, Walter G. Jr.
Bronstein, Murray L.
Cordt, Hildegarde R.
Crowell, Henry C.
Ensenberger, H. Joseph
Epstein, Leon
Firth, Mrs. Caryl
Fitzpatrick, John J.
Foy, Russell
De Frees, Charles W. S.
Garrison, W. L.
Goldberg, Jules
Halperin, Dr. Jacob
Henderson, Ken L.
Henney, Keith
Hertner, Henry E.
Hollingsworth, Lewis M.
Huber, Hazel
Kempf, Milton
Keresztes, L.
Kidder, Dr. Frank W.
Landess, Mrs. Eugene S.
Leictner, William H.
Leslie, Gary A.
Lewis, Warren W.
Libman, Arthur H.
Mason, Clint
McCallum, Robert
Mertens, Robert H.
Morse, Dr. Raymond C.
Mote, Oscar L.
McRae, Connell C.
Mullin, Thomas H.
Nerses, John Wilson
Nichols, R.
Ogden, Beecher
Pacholke, Fred
Peck, Mrs. George E.
Phelps,
Mrs. Constance L.
Preisel, Edward A.
Puchee, E. S.
Purinton, Stewart M.
Quinn, George, Jr.
Rachlin, Carol
Reade, B.A.
Rosher, Charles
Sammis, J. H.
Small, Dr. William F.
Smith, W. Gorin
Specht, Woldemar
Stanton, Howard B.
Starkle, Phil W.
Swenson, S. M.
Tau, Andrew
Tomlinson, Everett R.
Upham, Wendell K.
Weber, John R.
Werner, Gustave H.
Williams, Ernest H.
San Jose Camera Club
Tripod Camera Club

The goal of the fund is $5,000.00 of which 607 members have contributed $3,287.58 as of date.

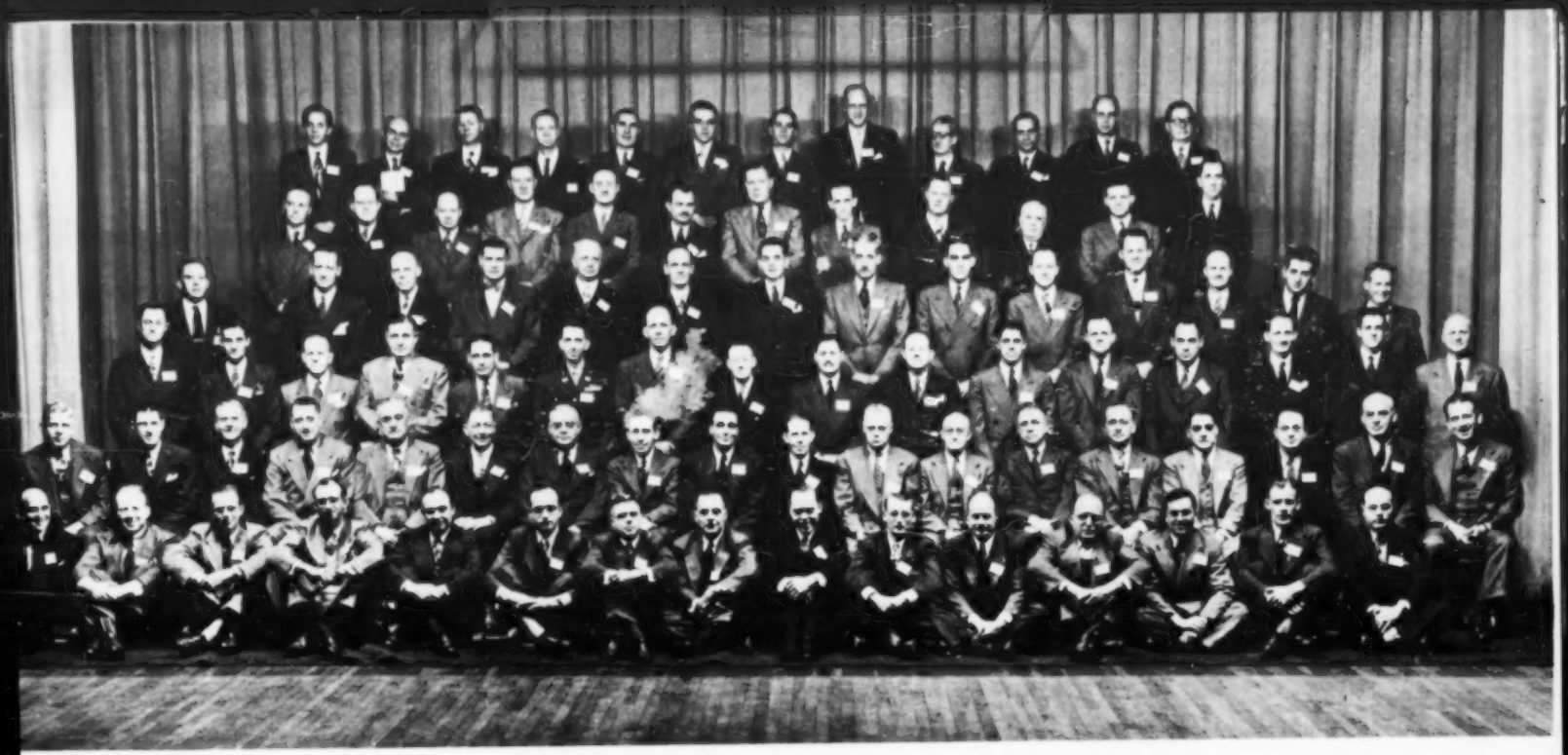
Armed Services Reserve

The Army, Navy, Air Force, Marine Corps and Coast Guard are all placing great reliance on an effective Reserve to enable them to meet their obligation to defend our country. Photography, as you all know, plays a definite and important part in all military and naval operations and it takes qualified men.

The Army and Air Force, particularly, are stepping up the formation of Reserve units, including photographic units, at this time. The great need is for junior officers, non-commissioned officers and for men to fill these units. The members of PSA can help this program by joining such reserve units or by encouraging others to do so. The requirements in time to be devoted to this activity by those who join a Reserve unit will vary from one or two meetings a month to a maximum of one training period (in the evening) per week.

Contact your local Armed Forces representative for full information.

COL. FRANK LIUNI, HON. PSA



GRAPHIC ARTS TECHNICAL CONFERENCE, ROCHESTER, NEW YORK, JANUARY 19, 1948

(*Back Row, left to right*) K. Strachan, Donnelley; H. Mayer, N.E.A. Service; F. Mortimer, G.P.O.; E. F. Burr, G.P.O.; J. Grant, G.P.O.; R. Rossell, Ft. Belvoir; N. Bumstead, National Geo.; W. Parker, Kodak; E. Beadie, R.I.T.; P. Quartararo, Kindred-McLean; C. B. Harris, A.T.F.; W. Griswold, Litho Tech. F.
(*Fifth Row, left to right*) A. Murray, Kodak; W. H. Wood, Harris-Seybold; F. A. Tompkins, Kodak; E. Wagner, Sr., Federal Litho; G. E. Matthews, Kodak; Dr. R. M. Schaffert, Battelle; C. F. Andrews, Kodak; A. C. Black, Crowell-Collier; J. P. Looney, Hydrographic Office; A. Wahl, Providence Litho; C. D. Oughton, Battelle; A. Thomsen, Kodak.
(*Fourth Row, left to right*) W. H. Roberts, Jr., Kodak; E. Gantert, Strecher-Traung; W. E. Brown, Kodak; E. Bierman, Charlotte Engr.; Randolph Ode, Providence Litho; J. Yule, Kodak; J. Whittle, Kodak; L. Wickland, Army Map Service; R. W. Gardner, Kodak; H. Gleason, Kodak; H. Leedy, Coloron Graphic; C. Q. Glassey, Kodak; M. J. Monse, Williams & Heinz; A. Keeler, Moore Bus. Forms.
(*Third Row, left to right*) F. Stalelmann, Intertype; D. Andella, National Geo.; F. Hacker, A.T.F.; C. Mattern, Kodak; A. M. Purbeck, Beck Engraving; Col. W. H. Mills, Army Map Service; C. Wynd, Kodak; E. L. Wisherd, National Geo.; T. Lucas, E.S.&A. Robinson; J. Cahn, Alco; A. Simmons, Kodak; Dr. D. J. Byers, Battelle; Dr. H. C. Staehle, Kodak; O. Eastbury, Moore Bus. Forms; D. Angold, Moore Bus. Forms; J. McMaster, Kodak.
(*Second Row, left to right*) N. Mears, Buckbee-Mears; S. G. Hall, Kodak; H. Freund, Intertype; J. E. McGhee, Kodak; P. Simone, Curtis; E. E. Jones, Graphic Arts Corp.; V. W. Hurst, Kodak; W. Baumrucker, Jr.; N. Y. News; L. Trayser, Curtis; F. J. Tritton, E.S.&A. Robinson; F. Andrews, Kodak; J. A. McLean, G.P.O.; C. A. Hunting, Donnelley; Dr. W. Clark, Kodak; M. Bruno, Litho Tech. F.; W. Kaiser, Ed. Stern; Dr. E.K. Carver, Kodak; G. Hammer, Forbes.
(*Front Row, left to right*) A. Clair, Kodak; J. Kremer, Stecher-Traung; C. Tate, Kodak; E. Wagner, Jr., Federal Litho; H. R. Sprentall, Kodak; M. Friend, Spaulding-Moss; C. Neblette, R.I.T.; J. Kreis, Crowell-Collier; R. Marder, A.T.F.; R. Leavitt, Kodak; D. G. Manley, A.T.F.; J. Cramer, Multigraph; F. Smith, General Motors; J. Morse, Brett Litho; R. Luciana, Haynes Litho

Technical Supplement

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THE GRAPHIC ARTS

Four papers presented at the Conference on Graphic Arts held by the Rochester Section, Photographic Society of America Technical Division, Rochester, New York, January 18, 1948.

Xerography, A New Principle of Photography and Graphic Reproduction

The Testing of Photographic Shutters

THE PHOTOGRAPHIC SOCIETY OF AMERICA

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The Fundamentals of Photomechanical Reproduction

By R. W. Gardner*

From the beginning of time, man has endeavored to record the happenings of his particular era for the benefit of generations to follow. History is not at all clear as to when he first learned how to produce multiple copies of recorded events, but the accomplishment of this feat was undoubtedly one of man's earliest endeavors.

Printing, as we know it, dates back at least 2000 years, since it is known that the Chinese were using movable metal type and printing on paper at the beginning of the Christian era. The use of pictorial illustration, of course, goes back almost as far as the history of man, who first used pictures, crude to be sure, drawn on the walls of caves to depict current events of his time. It is during the past hundred years or so that greatest progress has been made in the multiple reproduction of pictures by mechanical means.

Photography plays an important part in present day reproduction. This paper attempts to outline the various photomechanical processes in common use and to show the part which photography plays in them, indicating what happens in photomechanical reproduction after the copy has been prepared.

There are three processes in general use today. First is relief or letterpress printing in which the printing areas are raised in relief above the supporting body of the plate. The second is intaglio or gravure printing in which the printing area or ink bearing surfaces are below the surface of the supporting body. Third is planographic or chemical printing in which the image is on substantially the same level as the supporting body of the plate. A fourth is stencil printing, but since the photographic processes involved in this method are much the same as in one or more of the others, we shall not consider it.

Photoengraving

Relief or letterpress printing is the process by which most newspapers and the majority of our current magazines and books are produced. It may be somewhat difficult for those who have seen only the mechanical aspects of this operation, that is the actual printing to paper, to understand how photography enters into this process. Briefly, the answer is photoengraving.

Many people are inclined to think of photoengraving as an industry in and of itself. Actually, of course, it is a part of letterpress printing and fulfills the important function of providing the letterpress printer with the plates whereby he reproduces pictures which contain a variety of tones, or subjects, which by their nature, it is not practicable to reproduce by conventional typographical methods.

* Graphic Arts Division, Eastman Kodak Company

The subject matter to be reproduced by whatever process used is known as the "copy." The first step in any of the processes is to photograph the copy using a camera known as a "process" camera. Actually, this is merely an overgrown copying camera mounted on a bed of rigid construction so that no movement occurs with respect to the copyboard (or holder), the lens, and the focal plane in which the film is placed. This is of extreme importance since exposures are of relatively long duration ranging from several seconds to ten minutes or more. The camera bed is usually supported on springs, rubber, cork, or other vibration absorbing material to obviate the possibility of such movement.

In photoengraving, this negative is made on a high contrast stripping film. In such a stripping film, the emulsion is coated on a very thin film skin, which, in turn, is attached to a heavier film support by a water soluble adhesive. The anti-halation backing is on the temporary support. After exposure and processing, the negative image on the thin skin is removed from the temporary support and placed face down on a piece of glass where it is squeegeed flat. This is necessary since the image on the metal must be a positive but be laterally reversed. This explains one of the reasons for a stripping film. Actually, what is done is to print through the back of the negative to obtain the lateral reversal. If a heavier base material were used, it is readily apparent that a serious loss of detail would result. A second reason is that it is often desirable to combine two or more such negatives into what in effect is a single negative.

After the negative has been stripped to glass, it is printed by contact to a sheet of metal, either zinc or copper, which has been coated with a colloid, such as shellac or glue sensitized with bichromate. Wherever light strikes, the colloid is hardened. This hardening, either of itself or by later application of heat, forms the colloid into a resist which protects the metal from the action of the etching material. After exposure, the unhardened colloid, which has not been affected by the light, is removed by water or other suitable solvent. At this stage, a dye may be applied to make the image more readily apparent for study by the plate maker. After any treatment necessary to make the remaining hardened coating acid resistant, the metal is placed in an etching bath where the unwanted areas are etched away, leaving the printing areas in relief.

Planographic Printing

Planographic printing is sometimes known as the chemical printing process, since it is based on the fact that ink and water repel one another. The original of the process was known as lithography or "writing on

stone" since a particular type of limestone was used as the base on which the image was supported. Today metal, such as zinc or aluminum, is commonly used as the supporting medium, and most printing of this nature is not directly from the plate to paper but rather is transferred (or offset) to an intermediate medium, such as rubber, and in turn from the rubber blanket to paper. This process is known under a great variety of names, including lithography, photolithography, offset, offset-lithography, photo offset and many others. However, they all refer to the same general operations.

Whenever the offset principle is used, it is not necessary that the image on the plate be laterally reversed. Therefore a high content non-stripping film is the more commonly used negative material. The surface of the metal plate is first roughened or grained, which is necessary as an aid in retaining the moisture required in the printing process. The coating used is an albumin solution which has been sensitized with bichromate. The negative is placed in close contact with the coated plate, usually in a vacuum printing frame, and exposed to a white flame arc. Again, wherever light strikes the colloid it is hardened. Since it is necessary that the image have a greasy surface, the next step is to coat the entire plate with a very thin coating of extremely greasy ink. The plate is then placed in a tray of water in which the unhardened albumin is dissolved and washed away, carrying the ink with it from the non-printing areas. After some subsequent operations which make the grain of the plate receptive to moisture, the plate is ready for printing.

The printing cycle consists first of applying moisture which is accepted by the grain of the metal but is rejected by the greasy coating of the image. The second step is to apply ink. The greasy image will accept the printing ink, but the moisture in the non-printing areas prevent the ink from attaching itself to the metal. The third step consists of the transfer or offsetting of the ink image from the plate to the rubber blanket to the paper. Since all these operations are carried out by rotating cylinders, they are done at very high speeds.

Plates for this process are sometimes produced by a method known as deep-etch in which a positive is required to be printed to the coated metal. However, since the plate produced is substantially the same as that described above, it is not necessary to go into further detail.

You may well ask: "How do you reproduce tone if you use a high contrast material for your original negative?" The answer is the halftone process. Since the printing plate in the processes just described can only lay down a uniformly thick layer of ink, we cannot show tone by variations in thickness of our ink deposit. Furthermore, since the inks used are opaque, any wide variations in thickness would not be readily discernable. Therefore, rather than attempt to show detail in this manner, we do so by variation in the areas of ink deposited. If you will look at any picture in your daily newspaper closely, you will see these areas or dots. Use of a magnifying glass will make them even more readily apparent. You will note that in the highlight areas, there is a small black dot with relatively large areas of white surrounding them. As tones become darker, you find that the black dots are becoming larger and there is relatively less white showing until in the shadows, there is only a very small white area completely surrounded by black ink.

The so-called halftone negative is produced by photographing the original "copy" print through a halftone screen and subsequent operations as described above.

Gravure Printing

Another major printing process commences with a positive rather than a negative. It is exposed to a gelatin coated paper known as photogravure tissue, which has been sensitized with bichromate. The action of the light causes a hardening of the gelatin in proportion to the intensity of penetration. In the case of a tone subject such as a photograph, a continuous tone positive is used, and, therefore, the greatest degree of hardening occurs in the highlights and decreases toward the shadow areas. This exposed and hardened gelatin is attached to a sheet or cylinder of copper. By means of hot water, the paper backing and the unhardened gelatin is removed, leaving in effect a negative gelatin relief image on the metal.

This hardened gelatin serves as the acid resist. The etching solution must reach the metal by penetrating the gelatin and the amount of etching is controlled by the speed of penetration. It can be seen that in the highlight areas which have the heaviest coating of gelatin, the amount of etching is least. Conversely, in the shadow areas which have the least hardened gelatin, the amount of etching reaches a maximum.

The inks used in printing by this process are semi-transparent and tone effects are produced by variations in the amount of ink deposited on paper. Since the highlights are etched least, these depressions* hold only a little ink while the shadows which have been etched most carry the maximum amount of ink. The mechanical operation consists of spraying or otherwise applying ink to the plate, scraping the surplus off the non-printing surface of the plate by a squeegee-like operation, then pressing a sheet of paper to the plate thus lifting the ink from the depressions.

Conclusion

This outlines very briefly the major photomechanical processes. It becomes apparent that photography plays an important part in all of them. Yet, since the photographic operations are followed by others non-photographic in nature, it is evident that all these operations are interdependent on one another. While improvements in one may result in an improved final printed page, such an improvement need not necessarily follow. Therefore, it is important for those of us in photography to be fully familiar with developments in other fields, and endeavor to evaluate such developments with a view to considering the effect on our efforts.

* A fine grid is left unetched on the plate to hold the right amount of ink in each particular tiny area, but this scarcely shows in the reproduction and does not serve the same function as a halftone pattern.

The History of Photographic Text Composition

By H. R. Freund*

If Alois Senefelder, the inventor of lithography, could visit today's modern litho plants, he would be amazed at the great progress made in the art of lithography. He would recognize immediately that the principle of this type of printing today is basically the principle discovered by him in 1796, but its extensive improvements would exceed his widest expectations.

Certainly Senefelder would marvel at the modern camera which gives to the art large scale reproduction of copy, accurately and faithfully duplicated, enlarged or reduced, with maximum speed and precision. He would compare this method with the only method known to him of creating and duplicating images by tedious hand designing and copying on litho stone.

Further, he would see the modern application of his basic principle of the mutual repellancy of grease and water in the preparation and use of grained aluminum and zinc plates on rotary printing equipment.

Most assuredly, he never dreamed of a development like the modern rotary offset press, a press synthesizing the best achievements in mechanical design and incorporating all known methods of obtaining speed—the essence of printing progress.

He would marvel at the quality, the speed and the accuracy of four color printing on a single press and in a continuous operation. He would be fascinated as he watched the seemingly human operation of this press, as each sheet of paper is fed into the machine, guided to the registery unit, printed, conveyed and stacked, automatically, speedily and accurately.

Yes, we can well imagine how gratified Senefelder would be with these advancements, these innumerable refinements, all revolving around his basic principle of lithographic printing.

It would be very difficult indeed to attempt to evaluate these developments, but, undoubtedly, the camera, with its magic-like accomplishments would be Senefelder's choice. And he would be right. The advent of the camera, the discovery of light sensitized materials, the halftone screen, these and other developments, opened up unlimited possibilities in the art now known as photolithography.

However, the lack of a practical means of producing text matter photographically has been recognized for many years as a determent to the more rapid advancement of the photographic processes in the fields of printing. With the exception of a method of setting text photographically, all processes have been improved and refined to give the photo-printer the ultimate in speed, in quality and in economy. To fulfill his type requirements, however, the photo-printer must still go to the letterpress printer. His copy must first be composed, then cast in metal, followed by handling, makeup and lockup, before the photo-printer can secure the printed proof he requires. That this hindrance to photo-printing progress has been recognized is evidenced by the many attempts made to develop a method of producing text matter photographically by a direct process.

* Chief Engineer, Intertype Corp.

Early History

Interest in the development of a photo-composing machine began some 50 years ago and, tracing back through these years, over 60 patented machines have come to light. However, up to now, not a single commercial machine has appeared on the market. There are many reasons for this—too many to recite here, but a brief review of a few of the more prominent attempts to solve this problem will give an idea of the immensity of the task and the extent of creative imagination necessary to achieve the desired result .

1. As early as 1894, Porzolt, in Budapest, proposed the first single alphabet machine using character-bearing keybars. In response to the keyboard, the selected keybar, carried in an upright stationary drum, would swing inward to present its character to the optical axis through the center of the drum. The character was then illuminated and exposed on the sensitized plate or film which advanced after each exposure.

2. In 1898, Friese-Greene of England proposed the first multiple letter-bar machine. Here, upright letter-bars arranged side by side in a magazine, carried an entire alphabet of letters while on a black background. In response to the keyboard, the selected bars were released and, by gravity, reached a stop position corresponding to the letter on the key struck. The composed line appeared through a slot where it could be read and illuminated for photographing.

3. In 1899, Richards of Baltimore proposed a single alphabet machine with transparent characters arranged on a sector. Operation of the keyboard caused the sector to oscillate and present the desired letter to the optical axis. This appears to be the first machine to photograph by transmitted light.

4. In 1929, August and Hunter of London proposed a single alphabet machine of the film band type. This machine operated in response to a perforated tape prepared in advance on a special typewriter. This machine was developed to a high degree of mechanical detail.

5. The Uhertype machine, later called the Luminotype, first appeared in Hungary in 1925. The first style of this machine employed a glass alphabet cylinder which rotated in response to a perforated tape. Characters were reproduced in end-to-end lines on a sensitized ribbon film. Later this ribbon was cut at the end of each line and the lines assembled in galley form. In a later proposal, rotation of the glass cylinder and advancement of the film were effected by an assembled line of so-called control bodies.

6. In 1939, W. C. Huebner of New York patented a machine wherein the characters of a type face are arranged around a stationary disk-like character plate. For each character there is provided a complete optical

projection unit comprising a lens, shutter, light and reflecting mirrors. Upon operation of the keyboard, the projection unit for the selected character is electrically activated to project and photograph the character. Instead of a keyboard, a previously prepared perforated tape can be used to control selection of the projection units.

7. In 1941, Westover in England, proposed a machine employing a shiftable master character plate like the Monotype matrix plate, but with transparent characters for light transmission. Under control of a prepared perforated tape, the character plate is shifted to locate the successively desired letters. Other punchings in the tape serve to effect justification and letter spacing according to variant letter widths. Successive lines are reproduced letter-by-letter on a narrow strip of film advanced after each exposure.

8. In 1945, Elliott and others in England proposed a machine using the shiftable Monotype character plate, as in Westover, and operated under control of a prepared perforated tape. Elliott, however, proposed to let the film remain stationary and, by a movable mirror system, reflect the characters onto the film in proper spaced relation.

9. In 1925, Smothers in Holyoke proposed the first circulating matrix machine for photo-composition. Here a standard slug casting machine was converted for photography. The metal pot was replaced by a camera. The Smothers matrix carried a transparent character on glass in its edge. The assembled line was projected by transmitted light onto the sensitized surface.

10. In 1926, Robertson in England proposed his circulating matrix machine which was very similar to Smothers. His matrix, although different in form, also carried the character in glass on its narrow edge.

11. In 1926, Friedman and Bloom in New York proposed substituting a camera for the metal pot on a standard line casting machine. This machine was similar to the two previous attempts. The matrices were regular, standard matrices with opaque characters on the edges. The characters were projected onto the sensitized surface by reflected light.

Ideal Photocomposing Machine

The earlier attempts created much comment in the graphic arts and articles on their possibilities and limitations appeared in the press. Most interesting of these articles was one which was published over 25 years ago in the "British Printer." This article, after describing the many unsuccessful attempts made to produce a photocomposing machine, set up what it believed to be the requirements of an Ideal Photocomposing Machine. This portion of the article follows:

An ideal photographing composing machine must fulfill the following conditions: It should be designed on the "letter by letter" principle and should work at a high speed, at least as fast as any modern letterpress composing machine. It must be fully automatic in action.

It must give perfect spacing to each letter and perfect alignment to each line. The space between the lines must be automatically obtained, must be variable at will by the operator according to the job in hand, but, once set, it must repeat itself time after time without attention, and it must be more accurate than is obtainable with cast type and leads.

The lines must justify automatically, which means that in a "letter by letter" machine, the machine must know how many keys have been pressed, what is the total width of the characters thereby selected, how many words there are in the line and where the spaces are. It must then control itself in such a manner that the spaces between words are expanded or contracted before an exposure is made on the sensitized surface.

The ideal machine will provide for the semi-automatic correction of compositors' errors before the letters are photographed and replace an incorrect letter with the correct one.

Since it is impossible to see what is going on inside the camera, an indication of each letter composed must be visible to the operator as he works the keyboard.

The machine must carry a large number of faces or styles of type, any one of which must be instantly and automatically brought into use, and must provide for a good range of sizes of each face by photographic enlargement or reduction.

The mechanical parts of an ideal machine must be absolutely accurate in all the various places where accuracy is required and must not wear inaccurate in constant use.

Every character of each face in each size must, on pressure of its key, repeat its various automatic movements any number of times without the slightest inaccuracy in the finished negative. Once the machine is set for, say 3 point line spacing, it must go on spacing 3 points to a fraction of a thousandths of an inch, line after line, until the operator changes it to something else.

When the end of a line is reached, the carriage, as on a typewriter, must return to its starting point, but must do so automatically, at high speed.

In the ideal machine, there will be no waiting between lines. The operator will go on composing line after line, merely indicating to the machine that the end of a line has been reached by means of a special key.

The justifying will then be done by the machine, and all necessary movements in preparation for the new line will take place automatically.

The operator will go on setting all the time until an audible or visible signal warns him that he is approaching the end of his sensitized film. He will then take out the complete film and replace it in daylight with another, handing over the exposed film for development. In a few minutes, this film will be ready to go down on the lithographic plate.

The Intertype Fotosetter

For many years Intertype Corporation, too, had been searching for that important basic idea which would lead to the evolution of a commercially practical method of setting photocomposed text. When, during a visit to Europe in September of 1936, President Neal Dow Becker was approached with an idea for a new and revolutionary design in a photographic character-bearing matrix, he recognized that the all-important "basic" idea for which we had been searching, was now a reality and that the nucleus of the Intertype Fotosetter had been born.

This matrix, in its embryonic form, was turned over to the Intertype engineering staff to be refined, developed and made commercially practical.

For almost a decade, Intertype engineers have labored on the twofold problem of, first, refining and producing a practical matrix which would not only present at all times, a perfect photographic image to the camera, but which would also withstand the most adverse conditions in use; and of, second, building the machine which would meet all the requirements of the ideal photo text composing machine.

The road has not been an easy one. Numerous ideas were advanced, developed and then discarded in favor of other ideas with further refinements. The requirements of the offset lithographer and gravure printer were investigated in an effort to give to these trades a machine which would not only meet, but exceed the standards advanced for a machine of the kind described.

Extensive research, sound engineering and skillful workmanship were combined with the result that these ideals, and more, are now a reality in the Intertype Fotosetter.

Briefly, the Fotosetter is built on the familiar principle of the present slug casting machine. Circulating matrices, stored in magazines and carrying tooth combinations for distribution into these magazines are used. Manipulation of the keyboard releases the matrices from the magazine and assembles them in the assem-

bling elevator in lines of any length desired. Here the operator may make any corrections necessary just as he does on a slug casting machine. In fact, any line casting machine operator can operate this machine almost instantly; there is very little new for him to learn or do.

In place of the casting mechanism, camera equipment is used. After the line is delivered to the justifying mechanism, the camera begins to function and the assembled line is projected and photographed letter by letter onto the sensitized paper or film.

Simultaneously the line is automatically justified to a predetermined length, line after line and with any desired spacing between lines. After the line has been photographed, the matrices are returned to the magazines to be used again, just as on a slug casting machine. Should composition be interrupted for any reason, the second elevator, which has raised the line of matrices just photographed, stops automatically in a convenient position for easy reading. Here the operator may check the lines previously set and photographed. Immediately after the first word of the succeeding line has been set, the second elevator starts automatically and continues to the distributing position.

The Intertype Fotosetter is designed on the "letter by letter" principle of photographing each character individually rather than on the "line by line" principle of photographing an entire line at a time. This insures an absolutely accurate reproduction with no possibility of distortions.

The Intertype Fotomat is a matrix that is entirely new and revolutionary in design. The master character, in the form of a photographic image, is embedded in the side of the matrix, secured in position and fully protected from injury.

Because the principle of circulating individual matrices is used and because each matrix thickness is equal to the width of the character it bears, each letter is perfectly spaced and aligned during the process of photographing on the sensitized film or paper.

The amount of spacing required for justifying a line is automatically divided throughout the entire line, between characters, if necessary, as well as between words.

Of special interest to typographers is the full-kerning, close fitting italic composition of the Fotosetter. Also the objectionable spacing often seen between such letters as caps W, V, Y, T, L, etc., with adjacent letters, is overcome without the use of a single logotype or ligature. This is accomplished by placing kerning characters on a matrix of a thickness smaller than the width of the character. This is similar to the method used by the type founders.

In its simplest form, the camera operates as follows: As each matrix is removed from the assembled line, a rack follows up the remaining portion of the line. This rack, in turn, permits the film carriage containing the sensitized film or paper, to drop a distance equal to or proportionate to the thickness of the matrix removed. The relative movement of the film is controlled by a gear transmission situated between the horizontal rack which follows up the matrix line, and a vertical rack which permits the film carriage to drop by gravity.

The matrices are advanced vertically to the light beam for photographing and, finally, to the distributing position by intermittent motion at a speed far exceeding any operator's ability to compose.

The film feeding mechanism has two film containers. In one of these containers as much as 20 feet of film can be stored. After the line has been photographed, a special feeding mechanism advances the film an accurate, predetermined amount and feeds it into the other or receiving container. This container can be removed for development at any time, in daylight and with any amount of exposed film. A convenient way is to remove the film when the equivalent of a galley of type matter has been set.

The camera is hinged on the machine in such a way that it can be swung open for inspection, or it can be removed from the machine as a complete unit.

The characters in the matrices are illuminated by a 6 volt, 50 candle power standard headlight bulb. This bulb is used in conjunction with a reflecting mirror and a simple condensing lens system. The intensity of the light is indicated on a light meter clearly visible to the operator. A constant voltage transformer unit regulates voltage fluctuation.

The lenses for the Fotosetter camera were developed by the Eastman Kodak Company. As many as eight lenses can be mounted in a lens turret and, by means of a simple knob and dial, within easy reach of the operator, any one of these lenses can be accurately positioned with respect to the optical axis. These lenses are pre-focused to magnify or reduce the matrix character accurately and to project the character image onto the Kodalith paper, but the film is a special Kodalith product developed by the Eastman Kodak Company.

By this means, the Fotosetter can set eight different sizes of type matter from the same font of matrices and, for the entire range of regular sizes from 4 to 36 points, only two fonts of matrices are required. This means important savings in investment costs, fewer operations for the operator in changing magazines as well as less storage space for magazines. A Fotosetter, equipped with four magazines and eight lenses can produce 32 different type faces and, when you consider that each magazine has 114 different characters, we have the amazing total of 114 x 32, or 3,648 different characters instantly available to the operator.

A Fotosetter has been operating on a field test at the Government Printing Office in Washington since November of 1946. Before putting the machine into production, the Government Printing Office made up a specimen book of the faces and sizes available on the machine. This machine was equipped with the Garamond series, the Garamond Light and Light Italic, and Garamond Bold and Bold Italic. The specimens show the different sizes of type which can be set without making a magazine change. Since the specimen pages were produced, the Government Printing Office has set and printed by offset, many nationally distributed booklets.

An examination of the actual booklets, which are available on request, will convince you that the offset printing done by the Government Printing Office, aided by the Fotosetter, is of the highest quality.

The development of a machine like the Fotosetter requires the combined efforts and cooperation of many, and we have been fortunate, indeed, in having had that excellent cooperation.

The Control of Tone Reproduction in Lithography

By Michael H. Bruno and George W. Jorgensen*

Abstract

The control of tone reproduction is the aim of all research by the Lithographic Technical Foundation. Studies are in progress on the reproduction of tone values in photography, platemaking, and printing on the press. So far only exploratory studies in photography have been made. This phase of tone reproduction, however, has received much attention and a brief survey of the recent literature is given.

The new LTF Sensitivity Guide for the control of tone reproduction in platemaking is described. It consists of a calibrated, continuous tone step wedge which is exposed with the subject on either albumin or deep-etch plates. The number of the last printing step which appears on the developed plate is an accurate measure of the sensitivity of the coating, and, consequently, of its tone reproduction characteristics.

Considerable progress has been made in the direction of controlling tone reproduction in printing on the press by the development of metal surface treatments, such as Cronak for zinc, and Brunak for aluminum, and the introduction of superior desensitizing agents such as cellulose gum. The metal treatments and cellulose gum improve the wettability of the plate by water so that many of the troubles affecting tone reproduction on the press, such as image spreading, sharpening, blinding, scumming, low ink density due to ink emulsification, etc., are eliminated or minimized.

Reasonably accurate control of tone values in platemaking and printing are in sight. The problem of precise practical control of tone reproduction in photography remains to be solved.

Introduction

Tone reproduction should be a familiar term to anyone who has worked seriously in photography. It describes the relationship between a subject and its reproduction. Ideal tone reproduction is achieved when an original photograph and its copy, laid side by side, are indistinguishable. This is the aim of every Graphic Arts process and it forms the basis or nucleus of the entire research program of the Lithographic Technical Foundation. Every project on its agenda relates to the solution of the problems in each phase of the process that affects tone reproduction; namely, photography, platemaking, and printing on the press.

The lithographer is not generally concerned with the subjective phases of tone reproduction which plague the artist and photographer. The aesthetic values are usually incorporated in the copy he receives except when the customer requests subjective changes to emphasize his product or satisfy other desires. As a general rule, however, the lithographer's job is to reproduce the original objectively, tone for tone . . . a simple demand but a difficult one to satisfy.

* Research Department, Lithographic Technical Foundation, Chicago, Ill.

The exacting requirements and complexities of photographic tone reproduction are well known to those who have attempted facsimile reproductions photographically. The task of the lithographer is further complicated by the need to translate the continuous tone subject into a halftone negative or positive in which the tones are represented by equally spaced, opaque dots having different areas as shown in Figure 1. In addition

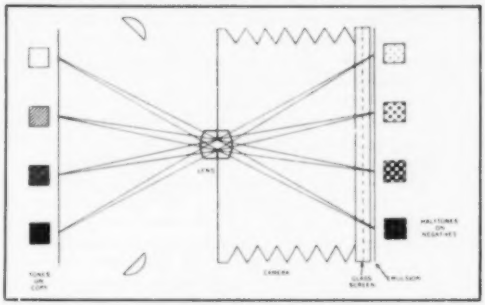

Figure 1. Halftone formation with the glass screen.

he must contend with the tone reproduction characteristics of his platemaking materials. Litho plates start with grained metal coated with a bichromated colloid. Tone reproduction in platemaking depends on the sensitivity of the coating, and this is affected by a number of factors that include relative humidity, dark reaction, continuing reaction, grain and condition of the metal surface, pH of coating, coating thickness, etc. As though this were not enough to worry about, he must also take into account the development of the plate and the many variable factors which affect tone reproduction on the offset press such as the paper and ink, mechanical adjustments, cylinder and roller pressures, the tendency of images to sharpen or spread, blinding, scumming, and variable ink density due to improper ink distribution and emulsification with the dampening solutions.

Facsimile reproduction by lithography is not only difficult; it would appear almost impossible. But lithography is not the only Graphic Arts process to suffer from these complications. Letterpress, gravure, and collotype are faced with similar problems. Each transfer step in a reproduction process . . . copy to negative, negative to plate, plate to paper . . . introduces its own tone reproduction errors. The greater the number of transfer steps, the greater the complications which are encountered. The lithographic industry was perhaps the first to conduct scientific research on its problems by organizing the Lithographic Technical Foundation in 1924. The LTF's research program, recently accelerated, has already found the answers to some of the basic problems and is well on the way toward the solution of others.

Tone Reproduction in Photography

The study of tone reproduction in photography is high on the priority list of LTF research. Much original exploratory work has already been done by P. W. Dorst (1). This is being coordinated with the work of other researchers into an extensive study which will attempt first to establish tone control in single color reproduction and then with this knowledge attack the problems of tone reproduction in process color. A thorough survey of the subject has been made. The factors which must be studied are many and varied. Here is a brief resume of some of these factors and the status of current work and reasoning on the subject.

Tone reproduction in photography has attracted considerable attention in the literature (2) since Hurter and Driffield conducted their classical studies on photographic sensitometry 70 years ago. The subject is covered in a lucid and comprehensive manner by D. A. Spencer (3) in a recent article entitled "Tone Rendering in the Reproduction of Photographs." This article is of particular interest at this time because it deals with reproduction not only by photography, but also by letterpress, lithography, and gravure.

The problems of tone reproduction in continuous tone and halftone photography are different, but the lithographer must often deal with both. In single color reproduction, halftones are usually made directly from the original copy and only the problems of tone reproduction in halftone photography are involved. But in color process reproduction, both must be considered and controlled because continuous tone color separation negatives generally are made from the original, and, after suitable correction, these are used to make halftone positives directly, or continuous tone positives and then halftone negatives. The tone reproduction demands of color process photography are a study in themselves and will not be mentioned here.

Spencer (3) deals with the problems of continuous tone and halftone reproduction and points out the main differences between the two. Continuous tone reproductions are characterized by good tone rendering in the middletones but are distorted by low contrast in the highlights and shadows. Uncorrected halftones, on the other hand, show distortions throughout the scale which are partialy corrected during printing by ink spread. (4).

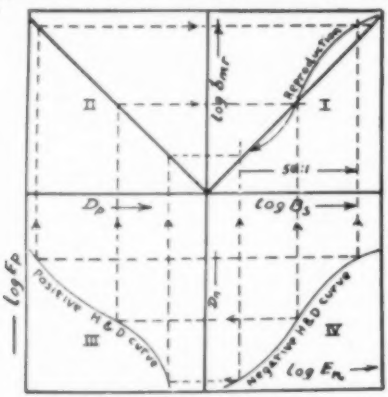

Figure 2. Halftone Reproduction in Lithography. "Heavy curves are typical of the tone rendering attained in normal practice in lithography without manual dot reduction. The tone rendering of an ideal screen negative and litho screen positives therefrom is shown in broken line." (3)

Continuous Tone

Typical continuous tone reproduction is illustrated in Figure 2. The distortion due to decreased contrast in the highlights is apparent in the negative and it is aggravated by each succeeding photographic operation. It is the correction of this distortion which tone control techniques in continuous tone photography try to achieve. Reasonable success has been obtained by the use of photographic masks (6). Masking, however, is a subject in itself. Suffice it to say that most of the problems of tone reproduction in continuous tone photography can be solved by the intelligent use of photographic masks. Lithographers have realized this and masking is just beginning to perform some of the tone correction previously done exclusively by handwork.

Halftone

The problems of halftone reproduction are not so easily solved. Here, progress has been hindered by the use of the glass screen whose tone reproduction characteristics are extremely difficult to control. Typical reproduction from an uncorrected halftone is illustrated in Figure 3. The curves on the left illustrate the wide deviation between the "actual" negative curve and the "ideal" curve. The curves on the right show the serious distortion of tones in the "actual" reproduction throughout the scale. Note the shape of the "ideal" continuous tone reproduction which is a straight line.

The poor tone reproduction characteristics of the glass cross-line screen were first mentioned by H. E. Ives (7) in 1926 and later investigated further by F. J. Tritton and E. T. Wilson (8). In a series of three articles on the "Theory of the Halftone Process," J. A. C. Yule (9) attempts to explain screen action and discusses some of the factors that affect tone reproduction. Yule, F. B. Johnston and A. Murray (10) in a paper published in 1942 indicate that the glass screen is capable of better tone reproduction but that "optimum conditions have rarely been realized, in commercial production."

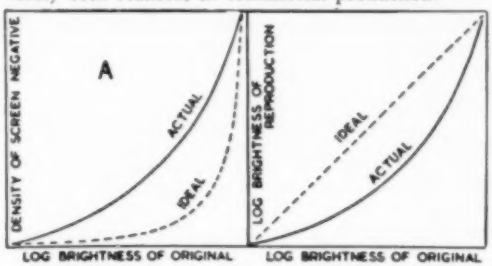

Figure 3. Continuous Tone Reproduction. "Graphical Method of determining the faithfulness of the tone reproduction with hypothetical negative (a) and positive materials (b) 5.

The conventional use of the glass screen in halftone photography must therefore be supplemented with considerable tone correction to compensate for the poor reproduction qualities now being obtained. The most practical tone correction method developed so far has been dot etching .... the manual reduction of dot sizes. Ives (7) suggested the use of intermediate negatives suitably distorted in place of the original, but Tritton and Wilson (8) found this method exceedingly impractical. Despite their conclusion, however, this method of correction should find some application in color process reproduction where negatives and positives can be "tailormade" to fit subsequent photographic operations.

The most promising approach to the improvement of halftone reproduction is the replacement of the glass screen in photography with the dyed contact screens developed by Yule, Johnston and Murray (10) of the Kodak Research Laboratories. Contact screens are not new. The principles of their manufacture and use have been known for years (11). But previous contact screens all suffered from two main disadvantages. First, it was impossible to control contrast because each screen had specific contrast characteristics which made it useful only for the reproduction of originals with a specified contrast range. Second, the tone reproduction characteristics of the screens were no better than those of the glass screen. The new contact screens of Yule, Johnston and Murray have eliminated these disadvantages. Dyeing the dot elements has made it possible to control reproduction contrast by the use of color filters. But most important, tone reproduction has been improved. The incorporation of deliberate distortions in the density gradation of the dots of the contact screen compensates for the poor reproduction characteristics inherent in the halftone process. Tone rendering as reported for the dyed contact screen is illustrated in Figure 4.

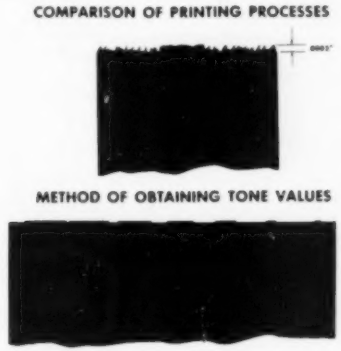

Figure 4. "Tone rendering of a contact screen process now available commercially." (10)

The proposed LTF research on tone reproduction involves first a statistical study of those tone distortions introduced in platemaking and printing. A knowledge of these distortions will reveal the nature and extent of the corrections necessary in the photographic operation to obtain facsimile reproduction in the final halftone printing. A study will then be made to determine how the tone reproduction characteristics of glass and contact screens can be adjusted to take care of these corrections. After this has been accomplished, the problems of color process reproduction should not be too difficult in view of the extensive work being done on the correction of continuous tone reproduction by masking.

Tone Reproduction In Platemaking

A comprehensive study of the effects of platemaking on tone reproduction in lithography can be made only if and when the tone reproduction of the platemaking process itself can be controlled. Platemaking is described as a photomechanical process which implies the use of photosensitive materials supplemented by mechanical operations. Since all photosensitive materials have their own tone reproduction characteristics and mechanical operations are subject to variations even in the hands of skilled craftsmen, the control of such a process is expected to be difficult. After considerable study and effort, however, LTF has recently developed the LTF Sensitivity Guide which offers a simple but practical means to accomplish this control.

Platemaking Processes

There are two types of photomechanical printing plates used in lithography today . . . . albumin or other surface coated plates and deep-etch plates. Both start with grained metal plates either zinc or aluminum, coated with a bichromated colloid.

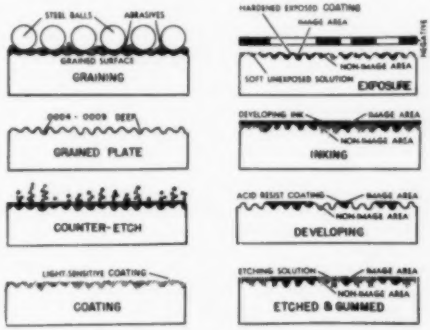

Figure 5. Albumin Process. Graphical representation of the steps involved in the preparation of an albumin plate.

ALBUMIN: The surface plate process is carried out as illustrated in Figure 5. The coating, generally bichromated albumin or a modified casein, is exposed through a line or halftone negative to a high intensity light source such as a white flame carbon arc. It is then coated with a dilute greasy ink known as developing ink, and developed or cleared in plain water or a very dilute alkaline solution. The development process removes the unexposed coating from the non-printing areas of the plate. Thorough development and clearing produces a plate on which the non-printing areas are apparently bare metal* and the image areas consist of tanned albumin covered with a greasy ink.

The plate is then "etched" with a solution containing a densensitizing agent such as gum arabic or cellulose gum (sodium carboxymethyl-cellulose) acidified with phosphoric acid and conditioned with other chemicals such as ammonium bichromate, magnesium nitrate, etc. The etching operation forms a hydrophilic layer on the non-printing areas of the plate which wets preferentially with water and repels ink on the press. The greasy image areas accept ink and repel the water. The plate is finally coated with a solution of the desensitizing agent and dried. This adds to the densensitization of the non-printing areas and forms a protective layer to prevent serious damage to the plate in handling.

DEEP-ETCH: The deep-etch process is illustrated in Figure 6. In this process the coating is generally bichromated gum arabic. The coated plate is exposed through a positive so that the *non*-printing areas are tanned. The plate is then developed with a lactic acid solution containing calcium chloride which removes the unexposed coating in the image areas.

* In the surface coating process there is evidence that a thin film of albumin or casein remains absorbed on the surface of the plate and is not removed in development and etching.

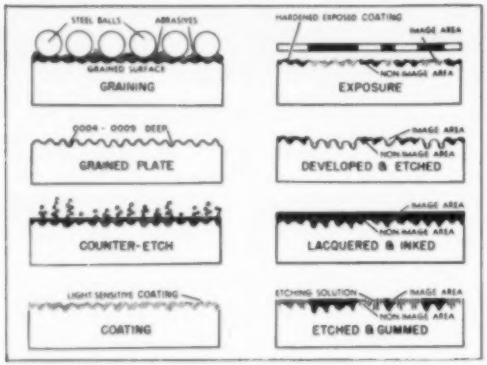

Figure 6. Deep-Etch Process. Graphical representation of the steps involved in the preparation of a deep-etch plate.

The cleared areas are then chemically etched with a solution similar to the developing solution except that it contains ferric chloride or hydrochloric acid in place of the lactic acid. The etched image areas are cleaned with anhydrous alcohol; lacquered; and covered with developing ink. After this preparation of the printing areas, most of the tanned gum arabic is removed from the non-printing areas with warm water. The cleared non-printing areas are then desensitized and gummed in the same manner as surface plates.

The main advantage of deep-etch plates is their longer life on the press. This is due to the thin film of partially tanned gum arabic which remains on the non-printing areas rendering them highly hydrophilic so that they print clean on the press with less water and less acid in the water fountain solution.

Tone Reproduction Factors

It is well known that dot sizes can be changed in both processes by varying the exposure of the plates. This is due to the fact that all halftone dots are surrounded by a fringe, or gradient fog of silver. Thus the degree to which this marginal fringe is printed through and the degree of tanning of the marginal bichromated colloid vary with exposure. The fringe is present in all halftones whether they are made in the camera or by contact . . . the only difference is in the fringe's slope or gradient. The fringe around typical halftone dots is illustrated in Figure 7. The nature of this fringe and the design and use of a dark-field desensitometer for measuring it are described by J. A. C. Yule (12) in the third article of his series on "The Theory of Halftone Process."

Because of the fringe, dot sizes on the plate can also be varied by plate development. In deep-etch, prolonged development increases the sizes of the dots because the developer penetrates through the marginally hardened fringe of gum arabic around each dot. In the albumin process, excessive pressure or manipulation and the use of alkaline solutions in development reduce the dot sizes, or sharpen the image, by removing the ink from the partially hardened edges of the dots. Other well known factors which can affect dot size in platemaking are mainly optical and include light spread through thick coatings; the use of double arcs; and the inversion, or "flopping," of negatives or positives. These will not be discussed here.

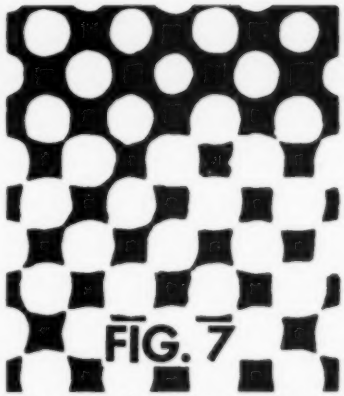

Figure 7. Photomicrograph of halftone negative on process dry plate.

To study and control tone values in platemaking, the exposure and development must either be standardized or controlled. Standardization is desirable but is not completely possible since development is a manual process and exposure is a function of sensitivity, which in turn, is affected by a host of factors. Development itself can produce the equivalent of a variation in sensitivity. Some of the principal factors affecting sensitivity are relative humidity, the grain and surface condition of the plate (whether it is oxidized or treated), the pH of the coating at the time of exposure, the coating technique (horizontal or vertical whirler, and whether heat is used and how much), the coating thickness, dark reaction (tanning which occurs during the time interval between coating and exposure), and continuing reaction (apparent increase in sensitivity during the time interval between coating and exposure), and continuing reaction (apparent increase in sensitivity during the time interval between exposure and development). The list of variables is long and any atempt to isolate and account for each one individually would be almost hopeless.

The LTF Sensitivity Guide

The solution to tone control in platemaking is to standardize as many of the variables as possible and then to supplement this with some means of measurement and control. The new LTF Sensitivity Guide seeks to accomplish this (13). By integrating the effects of all the variables, the guide indicates the adjustments necessary in exposure and development to maintain uniform production of tone values on the plate. Used properly, it will do for the platemaker what the densitometer has done for the photographer.

All methods of control require some means of measurement. Lack of a suitable means for measuring tone values on the printing plate accounts for most of the failures in previous studies on tone reproduction in platemaking. There are two conventional ways of expressing tone values: (1) in terms of the dot diameter, and (2) in terms of the integrated optical density of a tone area (14). The first method is tedious, impractical and inaccurate because dot shapes change and small variations in dot sizes, of an order less than the error of measurement, correspond to significant tone changes. The second method, which is used almost exclusively for expressing halftone values in photography, is useless

in platemaking because the variable background density and grain of the metal plate make density readings on the plate practically worthless.

Some other simpler and more practical method of measuring tone values had to be devised. During the course of LTF's study of the sensitivity of bichromated colloids it became apparent that a continuous tone gray scale could be used as an indirect measure of dot size. The gray scale may be considered as a greatly enlarged radial section of a single halftone dot . . . the gradations in the density of the gray scale steps corresponding to the vignetting in the silver fringe around the dot.

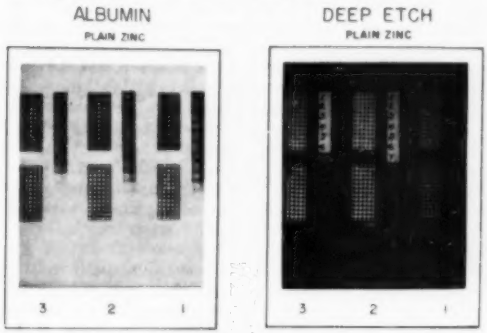

Figure 8. LTF Sensitivity Guide on albumin and deep-etch plates.

The new LTF Sensitivity Guide is based on this principle. It consists of a calibrated continuous tone step wedge in which the density increment between numbered steps is approximately 0.14. This is equivalent to a difference in light transmission of about 30 per cent between the steps. When this gray scale is exposed and developed alongside a halftone, one end of the scale appears as inked image and the other end is clear with a few intermediate partially inked or gray steps. The critical step, which is the last inked step in albumin and the last clear step in deep-etch, is a measure of the degree to which the fringe around the dots has been printed through. Once the amount of fringe on halftone positives and negatives is standardized in photography and the ideal degree of printing through this fringe is established in platemaking, the critical step can be used as a measure of plate sensitivity and development.

When the desired step has been established and the critical step on the plate does not coincide with it, a simple calculation with the following formula will reveal the adjustment necessary in exposure to produce a plate, coated and exposed under the same conditions, with the critical step in the desired place.

New exposure time equals transmission of critical step divided by transmission of desired step times old exposure time.

Adjustment of tone values by development to compensate for improper exposure is not recommended in the albumin process, but in deep-etch slight under-or over-exposure can be compensated by reducing or increasing the developing time or action. The LTF Sensitivity Guide provides an accurate means for controlling this. Development is carried out until the step next to the desired step begins to froth. The developing action is stopped at this point and the critical step of the plate will correspond with the desired step.

The guide may also be used to standardized line exposures and as a sensitometer to check different lots of coating solutions, different grains, and other factors affecting sensitivity, as long as all except the one under study can be controlled. It should find many more uses in lithographic platemaking and might even have application to the platemaking methods of the other graphic arts processes.

The use of the LTF Sensitivity Guide on an albumin and deep-etch plate is illustrated in Figure 8. Also illustrated are the effects of continuing reaction on apparent sensitivity and of sensitivity on halftones having fringes with different gradients. The halftone images on the upper parts of the plates were made from an enlarged 50 per cent halftone negative having a wide fringe around the dots. The images on the bottom half of the plates were made from a similar enlarged halftone with a narrow fringe. The areas marked (1) were exposed one hour after coating; (2) were exposed two hours later; and (3) five hours after coating. The relative humidity was 45 per cent. Note the shifting in the critical step of the LTF Sensitivity Guide due to continuing reaction. On the albumin plate the step shifts from 6 to 7 indicating an increase in light action equivalent to an increase in sensitivity of over 30 per cent. On the deep-etch plate it also shifts from 6 to 7 indicating a similar increase. The effect of this increase on the two types of halftones is obvious. The halftones with the wide fringe show a marked difference in dot size as a result of the continuing reaction. The difference in dot size of the halftone with the narrow fringe is small. It would be significant for a greater change such as that produced by higher relative humidity and longer continuing reaction. Appreciable variation of tone values in platemaking will be encountered unless halftones with consistently narrow fringes are used.

The development of the LTF Sensitivity Guide is an important step in the direction of tone reproduction control in lithography. Its use will allow some measure of standardization in platemaking so that its tone reproduction characteristics can be studied to determine their effect on the lithographic process as a whole. What is more important, it will make possible the practical control of tone values in production.

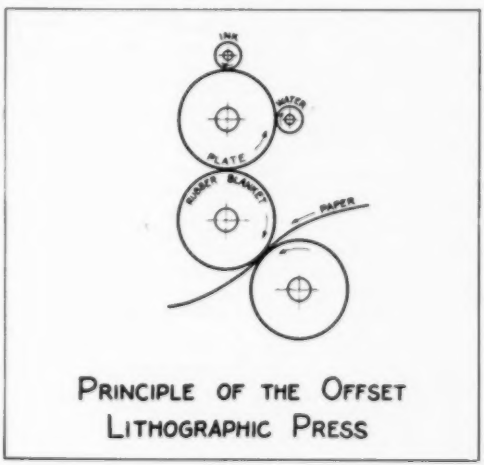

Figure 9

The full value of tone control in platemaking cannot be realized unless consistent and uniform printing of tone values can be achieved on the press. Printing on an offset press is illustrated in Figure 9. A study of tone reproduction on the press must consider the press and all its mechanical adjustments: the ink, its printing characteristics and distribution; the paper and its relation to the ink; the plate, and feeding on the press; and the wettability of the plate with water. All of these factors are important but they are interrelated and each is a study in itself. With the exception of the wettability of the plate, they will be considered only briefly.

Press Adjustments

All press adjustments are important as they affect the proper operation of the press, the feeding of the paper in register, and its delivery. The most important adjustments affecting tone reproduction, however, are those which maintain the pressure relationships between the plate, the blanket, and the paper, and the contact between the plate and the inking system and the plate and the dampening system. Improper adjustments can cause serious tone changes since they produce faulty transfer of ink from rollers to plate, plate to blanket, and blanket to paper, resulting in a poor image on the paper. Improper adjustments also promote undue emulsification of water in the ink, which reduces its printing density; increased dot spread due to an enlarged area of contact between the plate and blanket; or excessive wear of the image which sharpens or breaks up the dots and reduces the values of the tones. Modern equipment of advanced design and good pressmanship can eliminate or at least standardize these variables.

The blanket on the press also has some effect on tone reproduction. Its hardness affects the amount of printing pressure between the plate and blanket cylinders. A change in the condition of its surfaces due to embossing or glazing, affects the proper transfer of ink. LTF has done some research on rubber blankets and has developed new blanket treatments (15) which help to stabilize the condition of the blanket surface and standardize its printing characteristics.

Paper and Ink

Paper and ink both exert pronounced influences on tone reproduction. Control in printing cannot be achieved without studying these influences and standardizing the factors causing tone changes. The important properties of paper are reflectance and surface smoothness. The highest contrast of reproduction is usually obtained on high finish enamel papers. Dot spread is more apparent on coated and calendared papers with smooth non-porous surfaces, but the ink densities are generally higher. Prints on regular offset or rough textured porous papers are characterized by negligible dot spread and lower ink densities due to light diffusion by the rough surface. To achieve tone control then, definite adjustments must be made in photographic techniques to compensate for the effect of the paper on the tone reproduction.

The effects of ink on tone reproduction are due mainly to dot spread and ink density. These factors are considered in detail in LTF Technical Bulletin No. 5 entitled "The Relation between Dot Area, Dot Density and Tone Value for Halftone Images." The tendency of an ink to print sharp (reduce the dot size) or spread (increase the dot size) is dependent, to a great extent, on its consistency. Generally, a stiff, short ink promotes better tone reproduction. Inks are thixotrophic substances subject to plastic flow. Their consistency is an extremely important property. Until recently no reliable method for measuring consistency under actual printing conditions at press speed was known. LTF has corrected this situation by developing an instrument, called the Inkometer, which does this and makes it possible, finally, to standardize this most important variable in printing.

The density of ink on a printed sheet is affected by two factors: (1) the thickness of ink film transferred to the paper; and (2) the amount of water emulsified in the ink. The thickness of ink film depends on the condition and consistency of the ink, its distribution in the inking system, the receptivity of the image areas on the plate for ink, the condition of the blanket, and the pressure relationships between the rollers and cylinders. All these conditions are subject to control which makes possible the maintenance of a fairly constant thickness of ink film on the press. The amount of water emulsified in the ink, on the other hand, is difficult to control. Some inks absorb water up to as much as 30 per cent of their weight. Lithography is rarely printed with ink having less than 10-15 per cent of water emulsified in it (16). This changing amount of water in the ink causes appreciable differences in ink densities resulting in serious tone variations. Variable ink emulsification is a very serious problem in lithographic printing. It is associated largely with non-uniform dampening of the plate by water . . . a problem which has received considerable attention by LTF and is nearing solution.

Wettability of the Plate

Perhaps the most important single factor affecting tone reproduction on the press is the wettability of the plate by water. Improper wettability can result in sharpening, spreading, blinding of the image, and scumming of the non-printing areas. Emulsification of the ink in water can cause tinting of the non-printing areas. Emulsification of the water in the ink produces low ink density. The effect of each of these troubles on tone reproduction is obvious.

The wettability of the plate . . . its ability to carry water and print clean on the press . . . depends on how well the plate is desensitized in platemaking. The effectiveness of this desensitization is affected by three important factors: the surface area or grain of the plate; the surface condition of the metal; the desensitizing agent used and the technique of its application. All these factors are being studied and appreciable improvement in the control of tone values in printing has already been achieved.

GRAINING: The grain or surface roughness of the plate is important since it has some effect on the amount of densensitizing agent which is absorbed on the plate. It is desirable to have a fine even texture in the grain to eliminate raggedness of the image as much as possible. Past usage, however, made the wetting of such fine grains on the press difficult to control. Grain also has an important effect on the light sensitivity of the plate coating. Considering all these factors, LTF is attempting to develop procedures to produce uniform grains consistently on zinc and aluminum plates so that this variable can be standardized.

SURFACE TREATMENTS: A change in the surface condition of the metal has an important effect on tone reproduction since it affects not only the sensitivity of the coating but also the adhesion of the desensi-

tizing agent. Zinc and aluminum are both rather active metals chemically and they can oxidize or corrode. Oxidation, itself, is not serious if it aways advances to the same stage and remains constant. Varying stages of corrosion result in serious tone reproduction variations. Aluminum is not bad in this respect but it is subject to pitting under certain conditions. Zinc corrodes readily so that its surface condition is continually changing even during printing on the press.

Considerable improvement in tone reproduction has been made possible by stabilizing the condition of the metal with surface treatments. The use of Dilute Cronak (17) on zinc inhibits its corrosion almost completely. Recently LTF has developed a new corrosion-resistant surface treatment for aluminum which has been called Brunak. These treatments have resulted in plates with consistently firmer images and improved densensitization of the non-printing areas. Their use has eliminated almost completely the effects of surface condition of the metal on tone reproduction.

DESENSITIZING AGENTS: In the desensitization of a lithographic plate, a hydrophilic layer is formed on the non-printing areas. In addition to being affected by the grain and the condition of the surface of the plate, the effectiveness of this desensitization depends on the desensitizing agent used and its method of application. In the past, gum arabic was the universal densensitizing agent, but the great incidence of trouble from image sharpening, spreading, and blinding, and plate scumming aroused suspicions that gum arabic was not performing its function as effectively as is necessary for consistent tone reproduction. Extensive studies of desensitization revealed its mechanism and once this was known the search for superior desensitizing agents was simplified.

Cellulose gum (18), or sodium carboxymethyl cellulose, was found to be just such an agent. Used properly, it produces a highly hydrophilic layer on the non-printing areas of the plate which are wet well and print clean on the press with less water and less acid in the fountain solution. Thus, the improved wettability of the layer considerably reduces the tendency of images to sharpen, spread, or go blind, and the non-printing areas to scum. The decrease in the amount of water needed on the plate during printing minimizes the emulsification of the ink in the water and the water in the ink, so that tinting is practically eliminated and ink densities are increased.

A comparison of cellulose gum vs. gum arabic on an aluminum albumin plate, half of which was previously treated with Brunak, is shown in Figures 10 and 11. The areas marked A and C were Brunaked and areas B and D represent the coating on bare metal. On the left side of the plate, areas A and B were treated with an etch containing cellulose gum, magnesium nitrate and phosphoric acid, and gummed with an acidified solution of cellulose gum. On the right side of the plate, (areas C and D) an etch containing gum arabic, ammonium bichromate and phosphoric acid was used followed by gumming with gum arabic solution. The plate was run with plain tap water in the press fountain. Figure 10 shows the plate as it looked at the start of the run. Note that area D (gum arabic on bare aluminum) did not print clean at the start and note also the number of gray steps printing in the LTF Sensitivity Guide on this area. This indicates a considerable dot spread in the tone values. Figure 11 shows the appearance of the plate after it had been rolled up solid and cleaned with water

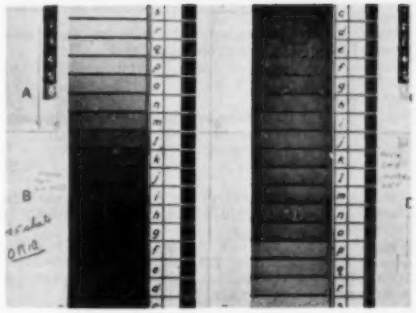

Figure 10. Press sheet showing the effects of metal surface treatment and densensitizing agents on tone reproduction of an aluminum albumin press plate.

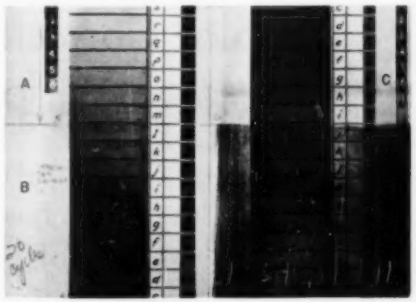

Figure 11. Press sheet showing the effects of 20 cycles of "rolling up" the plate used in Figure 10.

ten times. Area D is completely scummed. Area C is still fair but both areas (A and B) having the cellulose gum treatment showed little deterioration. This test is typical of many. The use of superior desensitizing agents and metal surface treatments are not only helping to improve tone reproduction . . . they are also increasing plate life and production.

Conclusion

The task of tone control in lithography is not an easy one. But, at least the thinking has been organized and the job has been started. Several phases of the problem have already been studied and acceptable solutions have been found. The proper use of the LTF Sensitivity Guide will control the reproduction of tone values in platemaking. Plate surface treatments, like Dilute Cronak for zinc and Brunak for aluminum, supported by the use of superior desensitizing agents like cellulose gum will help to control the printing of these tone values on the press provided it is operating properly.

Comprehensive studies of tone reproduction in photography and the effects of platemaking and printing on tone reproduction have been started. Success will be achieved when all these factors can be correlated.

BIBLIOGRAPHY

1. Dorst, P. W. "Halftone Densities." J. Opt. Soc. Am. 33,436-439 (1943) also "A Novel Graphical System for Representing Tone Reproduction Data." J. Opt. Soc. Am. 34,597-600 (1944)
2. Jones, L. A. "The Contrast of Photographic Printing Paper." J. Franklin Inst. 202,469,589 (1926); 203,111 (1927), 204,41 (1927)
3. Spencer, D. A. "Tone Rendering in the Reproduction of Photographs." Photo J. 87B, 94-104 (1947)

4. Yule, J.A.C. "The Theory of the Halftone Process." Part III J. Franklin Inst. 236,487 (1943)
5. Neblette, C. B. "Photography, Its Principles and Practice." Fourth Edition, p. 449, Van Nostrand, 1942
6. "The Masking Method of Color Reproduction," Bulletin for the Graphic Arts, Nos. 8, 9 and 10 (1947). Published by Eastman Kodak Co.
7. Ives, H. E. "Tone Reproduction in Halftone Photo-Engraving Process." J. Opt. Soc. Am. 13,536-552 (1926)
8. Tritton, F. J. and Wilson, E. T. "Tone Rendering by Transparent Screen Negatives and Positives." Photo. J. 79,396-405 (1939)
9. Yule, J.A.C. "The Theory of the Halftone Process." Parts 1, 2, and 3. J. Franklin Inst. 231,23-28 (1941); 235,483-489 (1943); 236, 473-488 (1943)
10. Yule, J.A.C., Johnston, F. B. and Murray, A. "A New Type of Contact Halftone Screen." J. Franklin Inst. 234, 587-582 (1942)
11. Tritton, F. J. and Wilson, E. T. "Tone Rendering by Vignetted or Contact Screens." Photo. J. 80, 65-71 (1940)
12. Yule, J.A.C. "The Theory of the Halftone Process" Part III J. Franklin Inst. 236,483 (1943)
13. Jorgensen, J. W. "A New Method for Measuring Plate Sensitivity." 15, 45 (1945); also "Research Progress," a pamphlet published by the Lithographic Technical Foundation, 1, 3 (1947)
14. "Optical Density." Technical Bulletin No. 4; also "The Relations between Dot Area, Dot Density and Tone Value." Technical Bulletin No. 5. Both by Lithographic Technical Foundation, Inc. (1945)
15. Reed, R. F. and George, A. "LithoKleen, An Improved Cleaner Preservative for Offset Blankets and Rollers." Research Bulletin No. 12 (1939). Lithographic Technical Foundation, Inc.
16. Reed, R. F., Cadwell, L. E., and Benemelis, R. L. "The Drying of Lithographic Ink." Research Bulletin No. 13 (1944). Lithographic Technical Foundation, Inc.
17. Bruno, M. H. "The New Dilute Cronak Process." Modern Lithography 15, 51 (1947)
18. Hartsuch, P. J. "Cellulose Gum—A Superior Densensitizing Agent." Lithographers J. 32, 10-11 (1947); also "A New Desensitizing Gum." Graphic Arts Monthly 18, 90-92 (1946)

Color Correction by Masking for High-Speed Rotary Printing with Heat-Set Inks

By Clyde A. Hunting*

Let us start by defining the terms used in the title of this paper, also certain other terms to be encountered later. Skipping for the time being "Color Correction" and "Masking" as employed in this discussion, "Letterpress" can best be defined for present purposes by contrasting it to the other two terms indicating other distinctive methods of printing which figure substantially in the country's output of printed material. These are "Gravure" or "Photogravure," and "Offset Lithography," more commonly called "Offset" or "Photo-Offset."

Gravure

Figures 1 and 2 show in simple outline the fundamental character of a gravure plate and method of printing.

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A gravure plate is usually a copper shell plated over a base cylinder of the press. This surface in all areas carrying any image consists of miniature isolated "wells," perhaps 150, 200, or more separate wells to the linear inch. These wells may be uniform in area or, in one modern version of color gravure, they may be variable in area; but in either case they will vary in depth in proportion to the desired color density. This gravure cylinder is printed by rotating it in a trough of rather thin soupy ink, and then a so-called "doctor blade" scrapes off the excess of ink from the surface. This cylinder, with all of its ink wells thus filled, then rolls into contact with paper that travels between it and a rubber blanketed impression roller, so that practically all of the ink is drawn or blotted out of the wells and forms the printed image.

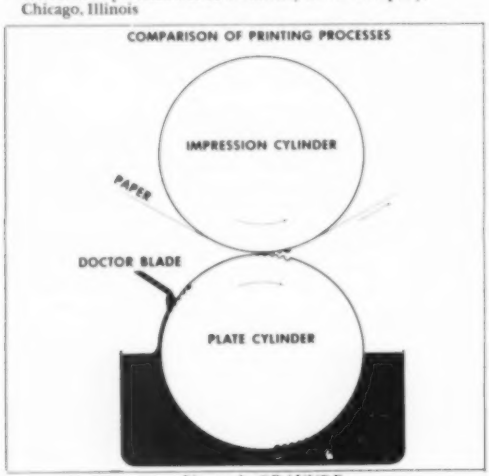

Figure 1—GRAVURE

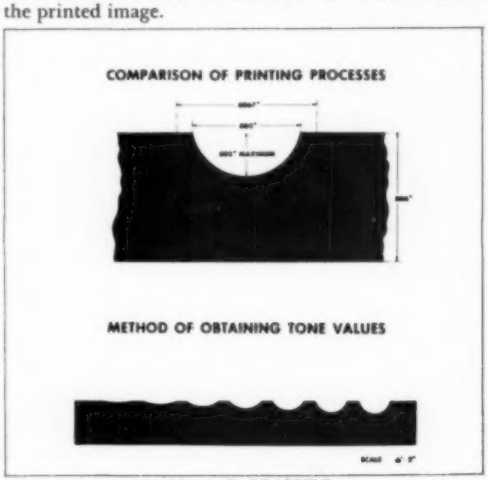

Figure 2—GRAVURE

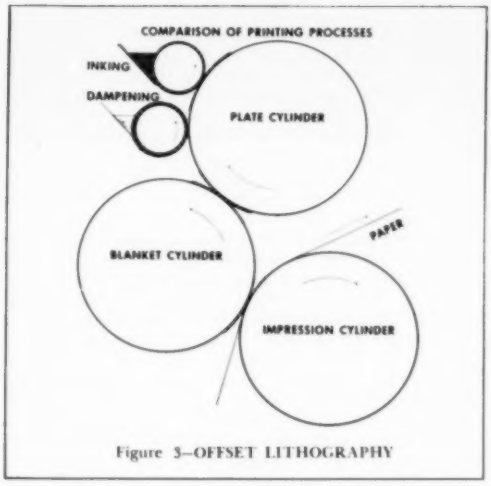

Figure 3—OFFSET LITHOGRAPHY

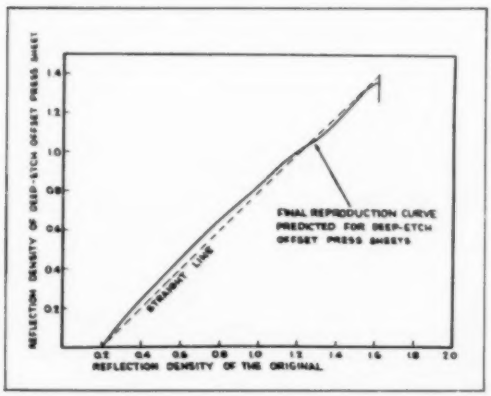

Figure 4—OFFSET LITHOGRAPHY

Offset

Figures 3 and 4 show the fundamental principle of offset printing and the nature of the offset plate. In this method both the printing and non-printing areas of the plate will all be at the same level and the surface of the plate has been treated mechanically, photographically and chemically so that all non-printing areas will accept a film of water and subsequently not accept ink; whereas the printing areas which form the picture design or type matter, etc., have been made receptive to greasy ink and will repel water. In operation, the offset plate which is relatively thin and flexible, is drawn tightly around a cylinder of the offset press. As the cylinder rotates, this offset surface comes first into contact with a water roller, then with an ink roller, and then with a rubber blanket roller which picks up the image from the metal offset plate and transfers or "offsets" this image in proper register onto the paper. In no offset printing process is it possible for the actual areas carrying the ink to receive substantially different pressure while making the impression than the closely adjoining non-printing areas.

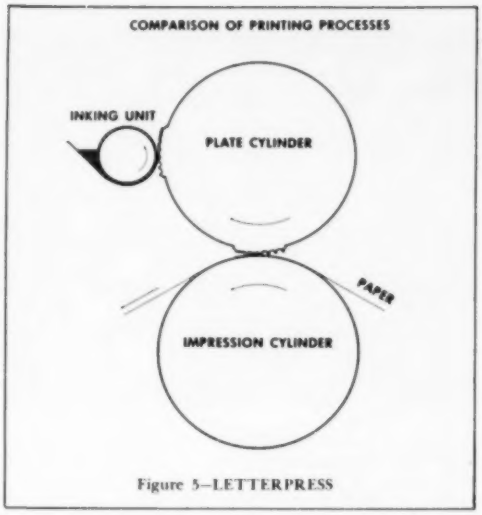

Figure 5—LETTERPRESS

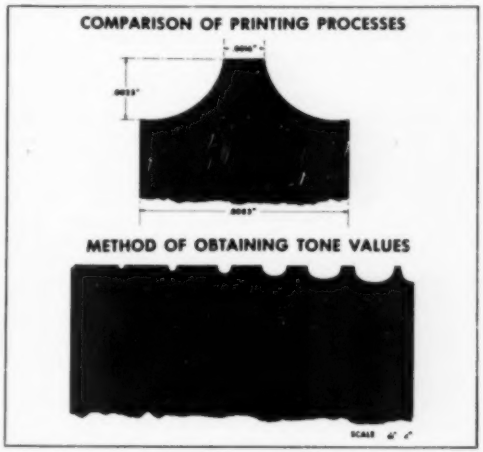

Figure 6—LETTERPRESS

Letterpress

Figures 5 and 6 outline letterpress. In all letterpress printing, the distinguishing characteristic is that all areas which carry an ink pattern, whether it be type matter or illustration, are at a substantially higher level than the non-printing areas. The printing image is presumed to lie entirely at the top surface of the plate and the rest of the plate is by chemical or mechanical means reduced to a lower level, which may vary from a very few thousands of an inch in a picture area to as much as two or three hundreds of an inch in type areas.

In particular, as shown in Figure 7, the top printing surface of a plate, which is to print a picture containing the complete scale of tones between highlight and shadow, will comprise an intricate pattern of small circles, squares, checkerboard formations, etc., each small unit of which comprises the top of a truncated cone, pyramid, etc. Now, in a so-called flatbed press, the entire printing

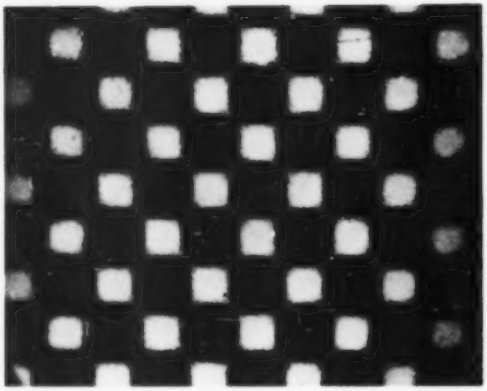

Figure 7

form including type and picture area is flat and the picture areas are most frequently printed from original halftone plates. However, in rotary printing the reciprocating motion of the flatbed press in which half of the motion is lost, is replaced by continuous rotating motion. This gives it a primary speed advantage but all actual printing areas must comprise plates which have been curved to fit the surface of a press cylinder.

These curved press plates are usually made by locking up the entire form for a page much as it would be done if it were to be printed flatbed, and then by making molded impressions of this entire page form in wax, lead, or more currently, in certain metal-backed plastic plates. These molded plastic matrices are rendered electro-conductive so that a metallic replica of the original page form can be reproduced by plating it into the impression formed on this conductive surface. The facts that this molding and plating process can be repeated as often as desired, and modern plastic matrices can be stored and replated if desired, and that the entire process duplicates the original form with a high degree of mechanical fidelity, are some of the principal advantages of this type of plate.

When the plating operation has been carried far enough to form a substantial metal "shell," this shell is then removed from the plating bath, filled in with a special backing alloy, and properly curved and prepared for anchoring on the press with special machinery. The most significant facts about this operation of making curved press plates from the original page form are: that the original form must stand up under relatively heavy molding pressure, perhaps 125 tons, and that the original form must release freely from the molded matrix impression. These two facts have a very definite bearing upon the significance of certain points to be subsequently discussed in connection with the masking technique.

The Halftone

We will briefly review those phases of the manufacture of a letterpress plate, commonly called a "halftone," in order to direct attention specifically to certain factors having a bearing upon the subsequent discussion. In the halftone process the continuous tone variations of an original to be reproduced must be broken up into a formation of dots of various shapes and sizes. In the so-called screen negative which embodies this transformation, the effect of the subsequent etching operations must be anticipated, and the process camera adjusted and manipulated so that the dots formed in the negative will stand the necessary reduction in size in the etching process. When this negative is then printed on copper, there is formed a positive dot formation image in which the areas that are subsequently to be ink-receptive surfaces are protected by an insoluble etch resistant coating, leaving all of the intervening or non-printing areas of free exposed copper.

This copper plate can then be etched so as to leave the printing dots standing in relief on top, by electrolytic means or by chemically oxidizing the exposed copper areas in a still bath or a mechanically agitated bath of ferric chloride. By whatever means the etching is done, however, the areas which are to print as highlights in the reproduction must have a surface area not smaller than 3 per cent of unit area, and the surrounding non-printing area must be etched down to a depth of about three one-thousands of an inch (on a 120-line plate). Other tones ranging from the highlight to the shadow will be left with correspondingly greater surface area in the dots and also will have less depth.

The size of the dot area diminishes as etching proceeds. This produces one type of metallic connector between the dots, say in a highlight area, if the dot is originally printed on the metal to the final etched size. Another type of connector results if it is necessary to produce a highlight dot from a dot formation which was printed down on metal as a substantially heavier area. In the first case the connectors between dots will be etched down almost to maximum depth whereas the corresponding connectors in the case of the latter situation will lie much nearer the top printing surface.

The etcher will carry on this operation, called "flat etching," until the highlight areas could not be safely etched any further without being too small to stand subsequent molding operations, or until some other spot or spots in the plate cannot safely lose any more area and still print sufficient color in that area. When this limiting condition is reached the etcher must then resort to "staging" and "re-etching." "Staging" means painting over the areas which must receive no further etching, with an asphaltum varnish, and then etching the remaining exposed areas until again a limiting dot size condition is reached. This operation of staging and re-etching must also be used to accentuate the proper separation of tone values when such separation was not printed down on the metal in the first place in such a manner as to be produced in the flat etching operations. It will, therefore, be seen that any area of the plate which was at the beginning of the etching operation

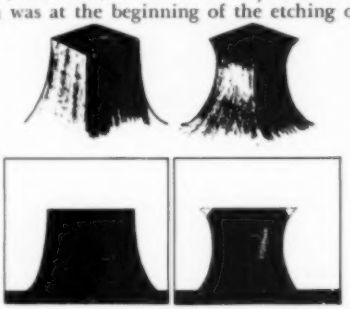

Figure 8. Effect of molding for electrotypes from correct dot and undercut on halftone plate.

protected by greater dot sizes than was necessary to produce the final dot areas desired, is an area in which the connectors will lie closer to the surface than would otherwise be the case and, hence are potentially more troublesome.

Another danger involved in the etching of letterpress plates is that of "under-cut" dots, sometimes also referred to as "umbrellas" or "toadstools." While this condition can be caused by defective halftone enamel which does not break away smoothly and at the proper rate from the edges of the dots as the etching proceeds, it is in practice most apt to happen in areas requiring excessive re-etching in order to establish the correct values. The consequence of this under-cut dot formation will be evident from a study of Figure 8. It will be seen that when a halftone plate is molded into a tough matrix material in the operation of making the necessary electrotype press plates, the first effect will be to shear off the finest edges of the under-cut dots, thereby establishing an area in the mold which is not a faithful replica of the area of the dots at the time when the plate was proved. The other obvious fact is that under the molding pressure the matrix material may flow into the residual under-cut, thus making a very effective lock joint, so that the original cannot be separated from the matrix without a tearing action which will inevitably alter previously determined tone values and also make for a mechanically poorer electrotype plate.

Figure 9. Effect of burnishing top of dot to increase printing area.

Figure 9 shows the technique and effect of "burnishing" This term identifies a technique used by an etcher when it is necessary to restore some color value where too much color has been etched out of the plate. This operation depends primarily upon the truncated structure of dots in the plate so that if the top of the dot is rubbed down to a lower level by abrasive action, there will be exposed a continuously increasing dot area. The danger involved in this action is that it tends to flare out the top of the dot and thus leave a dot structure physically somewhat similar to that of an under-cut dot. Hence, a deficiency of dot area at any point in a plate ready to be etched is potentially as troublesome as an excess of area.

Every photoengraved plate is "proved" before being locked into a form and molded. An O. K'd proof is supposed to be matched and capable of being matched on the production press. In the case of color work, a set of "progressive proofs," commonly called "progs," show the printed impression from each plate of a set in its own color, and the cumulative series of effects produced by each color being printed in register over the preceding colors, thus also establishing the "rotation," or sequence—usually yellow, red, blue, black or, sometimes, yellow, red, black, blue. However, proofs, since made from original plates, will not show the future effects of under-cut dots. Also, by judicious use of pressure too delicate or too excessive to be maintained and controlled on the production press, or by use of a stiffer ink

Figure 10. Shallow connector, troublesome printer, and deep connector, good printer.

than can be used in production, or allowing drying time between ink lays, connectors can be made to print or not print and a smoothness produced which cannot be subsequently matched on the production press. This involves the integrity as well as the skill of the photoengraver. In any event, unnumbered thousands of dollars' worth of press waiting time are involved in trying to eliminate or reduce discrepancies between progressive proofs and press sheets.

Thus on every count, it is desirable that the image printed down on the copper before any etching operation begins has all the tone values represented as nearly as possible by dot formation areas which will come down to the desired final size and depth with a flat etching, thus insuring a minimum of re-etching.

Direct and Indirect Method

A continuous tone colored picture can be converted into the necessary color separated screen negative images by two routes. In one, called the "direct" method, the colored subject is illuminated on the easel of a process camera, and the camera focused to the desired final reproduction size. Through the employment of the proper color separation filters and the use of a suitable halftone screen and a panchromatic process material, each of the necessary images is converted directly to a screen image. This method is limited to opaque colored copy or to transparencies of comparatively very low density range and has the inherent defect that all errors in color separation values are converted directly to the corresponding errors in dot area values. This in turn means that in the subsequent etching operation there must inevitably be a very large amount of hand re-etching to eliminate the excess areas of metal which will be left in the plate after flat etching is completed. Because of these limitations almost all opaque copy, as well as all colored transparencies, are now done in our plant by the "indirect" method, whose technique and advantages will now be explained.

The general outline of procedure for the "indirect" method is as follows: (1) Make the color separation negative to any desired size employing continuous tone panchromatic material; (2) Make continuous tone positives to any desired size from the continuous tone negative; (3) Place each of the continuous tone positives consecutively in a process camera and illuminating them as transparencies, convert each of the continuous tone positive images into a dot formation screen image, establishing the final layout for these final negatives at this point.

It will be seen by comparing the basic steps of the direct and indirect methods that the indirect technique necessarily involves more photographic operations and consequently more time before the necessary screen images for a given set of color plates can be placed on metal and the etching operations begun. However, this is an example of the manner in which a relatively small amount of extra time can be spent in one phase of a production operation in order to save a greater amount

of time, and, in many cases, to considerably improve the press performing quality and appearance of the final reproduction. This advantage can be augmented by making use of the additional steps required by the indirect method to introduce masking.

Color Reproduction

Let us consider briefly the basic theory on which the bulk of modern color reproduction depends. This is the so-called three-color theory which assumes that all color sensations of which the human mind is capable are produced by the stimulation of three primary sensations, namely: redness, greenness, and blueness. In a demonstration of the "additive" version of color reproduction, we assume (1) that we conduct the operation in a room from which all extraneous illumination is excluded, and (2) have a surface which is capable of reflecting uniformly all wave lengths of light able to excite visual impressions in the mind of a so-called standard observer (that is, a person not abnormal in color perception), and (3) that we project on this reflecting surface three separately imposed and accurately registered images taken from the original. One such image will contain only those parts capable of exciting the sensation of redness, the second capable of exciting only the sensation of greenness, and the third capable of exciting only the sensation of blueness. The superimposition of these three primary colors over each other will, where full intensities overlap, produce the sensation of whiteness, while mixtures of various intensities of the three colors will reproduce all of the color sensations of the original.

Those who have seen such additive projection of colorful subjects made with special taking and projecting equipment (modern versions of which are Thomascolor and Prisma-color, and of which the old Kodacolor taking a special lenticular film was another application), will realize that the three-color theory itself, although not absolutely proved thereby, is practically sound and capable of producing excellent results without any special reference to "color correction." Such a demonstration of the three-color theory in its additive version unfortunately causes advocates or sponsors of equipment and technique operating on this principle to think that they have thereby solved all basic problems of color reproduction, and that color separation images made with such equipment are therefore directly applicable to color printing with the complete elimination of all measures customarily employed in color correction.

A due consideration of the "subtractive" version of the three-color theory, together with certain subsequently indicated limitations in the application of this theory, will show why these superficial implications drawn from viewing an additive version are not true. In the subtractive version we assume (1) that we have a surface capable of uniformly reflecting all wave lengths of light able to excite visual impressions in the mind, and (2) that this surface is uniformly illuminated with a source of illumination radiating all such wave lengths or with discontinuous bands of wave lengths properly distributed to produce the visual sensation of white light. Since we start with a fully visible white surface, we must now proceed to selectively subtract color stimulation from this surface. We do this in our printed reproduction by laying down on this surface three properly separated and registered images, one of which will subtract or reduce the sensation of blueness (the yellow image), the second of which will subtract or reduce the stimulation of greenness (the magenta image), and the third of which will subtract or reduce the stimulation of redness (the cyan image). Having thus superimposed upon each other images capable of, partially or completely, subtracting all the wave lengths of light which can produce any color sensation in the mind, we thus have left the residual stimulation which may range from black (complete subtraction) or through all shades and hues to white.

In the ideal application of this subtractive theory we therefore make the following assumptions:

(1) That the correct filters, photographic emulsions and processing techniques are available for exactly separating or segregating the three correct sets of values from the original to be reproduced, and that the means are available for transferring each of these values, pure and undistorted, to the printed surface comprising the final image.

(2) That we have available the proper subtractive colors, namely—

(a) a yellow pigment which will not reflect any stimulation of blueness and which will completely reflect all available stimulation of redness and greenness.

(b) a magenta pigment which will reflect no stimulation of greenness and which will reflect all available stimulation of redness and blueness—and

(c) a cyan pigment which will not reflect any stimulation of redness and which will completely reflect all available stimulation of blueness and greenness.

(3) That these pigments described in (2) are available in sufficient quantities and at prices to meet commercial considerations of the job at hand.

(4) That these pigments can be properly ground in sufficient concentrations into a vehicle to make inks of suitable viscosity, distribution, drying and other "press performance" characteristics.

(5) That the respective ink images formed by coating the printing plates each with its proper color can be transferred one on top of the other in sufficient color density and at such speed as to meet the production requirements of the job for both quality and time.

(6) That the control of the ink distribution to the printing plates and subsequently to the paper can be maintained with sufficient precision to consistently reproduce all the black and neutral tones without any noticeable deviation from neutrality.

(7) That the necessary coverage of ink to meet preceding conditions will not be so heavy as to subsequently cause "offset" onto the back of the next-following sheet or facing page.

(8) That each of the inks will have the proper trapping qualities with reference to the other inks of a given set and with reference to the conditions of use.

That the three-color theory in its subtractive version is basically sound is amply demonstrated by the fact that the modern color transparencies, such as Kodachrome, Ektachrome, and Ansco Color and Dye-transfer Prints and Tri-chrome Carbros—all employ only three subtractive colors and no separate black image. No one will question the beauty, versatility and brilliance of thousands of subjects in numerous color exhibits which have embraced these materials. In particular, it is readily possible with any of these means to superimpose a sufficient quantity of each of the three solids into the surface or over each other, as to produce a good rendition of black and a tolerable rendition of a neutral tone scale.

With reference to the preceding eight points specifying necessary performance of colors for a three-color printing process, however, not a single one of them can be fully met and most of them are practically hopeless of achievement at the present time or in the foreseeable future. Available yellow inks are reasonably satisfactory with reference to absorption and reflection characteristics. However, all available magentas and cyans are seriously deficient. These ink deficiencies are thus the principal cause of relatively unsatisfactory color separations for printing purposes.

Whereas available red, green, and blue filters will serve admirably to separate the three sets of primary color images in an original when they are to be projected back additively into their own colors, there are no available filters which will take the colored original apart satisfactorily in terms of a commercially feasible set of printing inks. The net effect of this is that a considerable percentage of the values which should be confined entirely to the cyan printing plate will record also in corresponding areas on the separation which should contain only the magenta values, and still greater percentages of the proper cyan and magenta images will record in corresponding areas which should contain only these values for the yellow plate.

The situation is further aggravated by the fact that it is not possible to lay on a sufficient quantity of color from all three color plates to add up into anything even approaching a satisfactory black, or even to yield heavy neutral tones or dark shades of colors requiring relatively large quantities of all three colors to meet the printing conditions specified previously. The blacks and heavy neutral tones will invariably be degraded into reddish browns and the whole picture, being devoid of this basic skeleton of neutral tones, will have a degraded and washed-out appearance. Furthermore, in the areas represented by lighter tones where there are neutral grays which might be reproduced by a proper component of each of the three colors, it is so difficult to maintain such an exact control of color distribution under the stated conditions that it is impossible to keep these lighter neutral tones truly neutral at all times.

It is a very positive characteristic of the average human color perception that whereas many colors, such as oranges, browns, greens, etc., can deviate rather considerably from their true values without this deviation becoming conspicuous, such is not the case with any values which should naturally be neutral. The least deviation from neutrality in such areas immediately stamps the entire reproduction with a specious appearance. Nothing about it then looks right.

The sum total of all of the preceding complications is as follows:

(1) Extensive color correction by one means or another is necessary to rectify improper color separations so as to give the truest color renditions of which a given set of printing inks is capable.

(2) The practical printing process must be thought of as a 4-color process rather than a 3-color process because a black printing plate must be introduced in order to give solid blacks where they are required and to furnish a substantial element of the gray values of heavy neutral tones and of heavy shades of colors. The black plate also lends a certain crispness to fine detail in the tones approaching a highlight, and finally it acts as a "gyroscope" or stabilizing plate to keep neutral values relatively neutral in spite of any uncontrollable deviation in the balance of colors on the 3-color plate.

(3) Since this black plate is therefore thrust more or less arbitrarily ino a basic system dependent theoretically upon three primary colors, it becomes in effect an illegitimate member of the family and provision must be made for its accommodation into the series so that it will not do more harm than good.

Color Chart

Let us see briefly how the preceding general analysis of the subtractive version of the three-color theory as applied to high-speed color printing is supported by an examination of a standard color chart. The best one for the purpose is a systematic color identification chart provided by ink manufacturers. It affords a convenient means for identifying any given color with a four-digit number in terms of the dot area sizes of each of the component printing inks necessary to produce it.

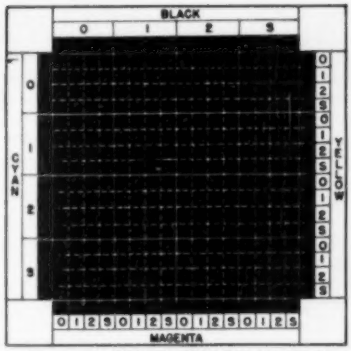

Figure 11—COLOR IDENTIFICATION

Suppose we refer only to the first vertical section of this chart which shows combinations of only the three colors in which there is no separate black. Then we would have to accept the conclusion that down in this lower right-hand corner of this first column, where we have super-imposed solid yellow, red, and blue, that we have a perfect black.

However, let us deviate progressively to other vertical sections of this chart in which increasingly large increments of separate black are laid over replicas of the first, or three-color section. By inspection at close range you will seen that we have nothing even approaching a black in our first section where there is no separate black, and that neither do we have a black where we have tried to print a solid black over heavy increments of the other colors. The best black is produced by a solid black laid over a certain limited area of undercolor. This limit of undercolor for the best black is under 40 per cent dot area for each color.

We will now define the "trapping" qualities of a set of printing inks as those manifold and mysterious characteristics which determine the extent to which a given ink in the set will release from a printing plate, adhere to a given printing surface, and offer adhesion for the inks to be printed over it. In high-speed letterpress color printing the time lapse in which these trapping qualities must be satisfactory is of the order of two-tenths of a second between impressions.

In theory, black or any other neutral tone can be produced by combining equal amounts of each of the three subtractive colors. Therefore, any given shade of color could theoretically be produced by segregating the black component of this shade into a black plate whose value would be determined by whichever of the three primaries was at a minimum, and the color completed by simply printing the excess of the other two colors over this minimum. Or, obviously, any fraction of the black value of a shade less than the maximum which that shade requires could be segregated into the black plate and the residual values in the three color plates adjusted accordingly. What this really means is that any color which excites some increment of all of the primary sensations to which the mind is responsive,

can be produced in an infinite number of ways depending upon the arbitrary balance struck between the separate black plate and the three color plates. A set of only three simultaneous equations containing four unknowns can have no unique solution for the unknowns unless some further arbitrary condition is imposed upon one of the unknowns. Specifically, this means that a systematic black must at each point always bear some mathematically describable relationship to the maximum black component of the color at that point, such as a constant ratio to that maximum or some logarithmic or other relationship. We will consider this indeterminate relationship of the black plate to the other three plates in further detail later on.

Application of Masking

We are now prepared to consider color correction and the application of masking technique to achieving such correction. We will define color correction as any operation, manual, chemical, mechanical, electrical, or photographic, necessary to alter the values established in a set of straight photographic color separations so as to render the final altered values suitable for producing the desired color under prescribed printing conditions. We will define masking as the process of achieving all or some portion of necessary color correction through preliminary or supplementary photographic operations which will produce a composite effect not producible by single primary operations.

Successful masking for color printing cannot be reduced to fixed rigid rules. Masking must be regarded first of all as a sort of philosophy; that is, you have to comprehend and assimilate it as a fundamentally desirable approach to the solution of a problem. You must then extract certain very flexible general principles which can be applied almost as many ways as can a slide rule. You must then develop a positive activated conviction which will constantly urge you to push the application of masking principles to the limit.

In this same connection you must become an ardent missionary of this philosophy because if your attempt to employ it directly in the continuous-tone phase of color separation work without first having an intimate mutual understanding with those who are to carry out the succeeding steps in making the plates for color work, they will not be able to take the greatest advantage of what can be done for them in masking. In fact, if the results of masking are thrust upon them without adequate preparation, their initial experiences may be quite disastrous and, therefore, tend to retard its wider application. Psychologically, it is best for those performing the continuous tone masking operations to establish an intimate liaison with the color etchers. Until an intimate mutual understanding has been developed, each job of color reproduction should be analyzed in advance with the etchers so that their desires can be executed as closely as possible or altered by mutual agreement. With a solid basis of observed results based on continuing experience, masking will spread in scope and extent. Be assured that there will be times centering around the contentions of a troublesome job when masking may be criticised due to inaccurate analysis of the real trouble. Then a convert may temporarily backslide but will almost certainly come back into the fold voluntarily.

It must also be borne in mind that etchers with many years of experience and very great skill in producing the plates for beautiful color work from completely uncorrected screen images, have set up certain routine habits which will at first be seriously disturbed when masking is introduced. These habits sometimes crystalize into strong prejudices.

The essential working principle of masking is that since unavoidable errors in the making of a set of straight color separations may inject some unwanted values in a separation, it will be possible to eliminate or reduce the unwanted values provided the errors involved can be completely or partially segregated in a supplementary exposure. Then the positive results from such a correcting exposure combined with the negative results of the original exposure containing the errors can be made to cancel or reduce the unwanted values.

While we cannot in practice actually segregate the corrective errors quite completely because the process of making the exposures for segregating these errors will also include some small increments of other errors, nevertheless, these can be manipulated in such a way as to leave a very substantial net gain. But it is these limiting secondary errors which also make it necessary to use discretion in the application of masking to any individual job.

Some of the foregoing remarks might lead to the impression that in actual practice masking is a more or less trial-and-error process with respect to each job. However, this is not the case. A certain amount of judgment, which is a sort of guesswork modified by experience, is involved in making the initial decision as to what is to be done. But from thereon, if the masking is to be successful, all data and information necessary for the detailed execution of all steps, and a very systematic means of co-ordinating this data must be available.

Time-gamma relationships must be carefully worked out for a wide range of contrast control. Precise color filter factors for each light source used must be established not only for the primary filters which may be best adapted to making the principal color separations, but also for special exposures for the isolation of masking values only. In order to suppress the effects of reciprocity failure, it is desirable that time-gamma curves be evolved based upon exposure through a series of specific densities whose maxima are related each to its own curve. If these maximum densities are taken within two-tenths of each other, the exposure and development data for a given density can then be accurately interpolated.

The so-called "k-value" as defined by the familiar equation $t = k \times o$ where t = *exposure time* and o = *opacity* (anti-log density) may therefore be defined verbally as the unit of exposure per unit of opacity. The determination of this k-value is done experimentally by ascertaining the exposure time necessary to expose through a density somewhere in the range that will be actually encountered in the employment of this k-value, and sufficient to produce a certain desired constant density when the resulting exposure is developed under absolutely standard conditions of time, temperature, and developer. However, in the operations which we are now considering our ultimate objective is to wind up with a set of positive transparencies in which not only all possible color error has been eliminated and which will also have a certain uniform density range throughout the set, but also will have a certain specific minimum and maximum density.

The nature of the ultimate corrections requires considerable maneuvering; hence, a wide choice of the

gamma factor. This in turn means that the conditions presumed in the determination of the k-value do not hold in its actual use. Therefore, in order to correct this discrepancy and avoid the necessity for determining a whole series of such values based on varying developing conditions, we have experimentally used the composite factor "k gamma" in the place of "k" whenever determining the developing conditions from a time-gamma curve.

This simple concept has worked sufficiently well in practice over a large volume of work extending over several years so that we have not thought it necessary to take the time to empirically determine a more precise scientifically justifiable means of compensation. Our working equation for predetermining all exposures to be made by projection, which covers the initial color separation from all Kodachromes and all final positives made from masked negatives, is as follows:

$$t = \frac{k\ c\ I\ \text{anti-log}\ D}{Y\ I_1}\left(\frac{F_1(1+r_1)}{F\ (1+r)}\right)^2$$

t = exposure time

k = unit exposure per unit opacity for plate or film used with unfiltered illumination of intensity "I" and standard developing conditions

$Y = \text{gamma} = \frac{\text{density range desired}}{\text{density range of copy}}$

F_1 = diaphragm setting of lens (for projection), or diameter of diffused light source (for contact)*

F = diaphragm setting of lens (for projection), or diameter of diffused light source (for contact) when k was determined*

r_1 = prevailing reproduction ratio

r = reproduction ratio at determination of k

D = maximum density of copy for color separations and positives or minimum density of Kodachrome when making duplicate (make D = 1 for duplicating Kodachromes)

C = filter factor

I = illumination intensity when k was determined

I_1 = prevailing illumination intensity

The extreme versatility of the masking technique is indicated by the manifold ways in which masking exposure may be made. These are: (1) direct contact exposures; (2) exposures with transparent separators of variable thickness between image surface and exposure surface, with annular illumination and light source adjustable as to area and position, or fixed illumination with large diffused source and at a fixed distance from the exposing setup; (3) the same variable factors as in "2" with the addition of variable degrees of translucence or diffusion in the separating medium; (4) projected masking exposure with the projected image intercepted at a variable distance before the light cones converge to critical focal points, thus giving control of the degree of diffusion in the mask; (5) projected mask exposed through back of the masking plate with the masking image lying in the same focal plane with the final exposure; (6) intermediate masks to modify final masks; (7) photographic material of variable effect due to color sensitivity in conjunction with various filters and variable contrast in relationship between emulsions and developers (time-gamma relations); and (8) the introduction of color differences between mask and modified subject. This gives us the effects of optical images modified by developed-up exposures, developed-up positives supplemented by developed-up positives, developed-up negatives modified by developed-up masks. It will be seen that this gives a very large indeterminate number of possible combinations, the study and effective use of which really makes masking a subject deserving of the most intimate study and puts it well on a par with color etching in the extent of its influence upon the final results. It also accentuates the importance of good color etching as it requires a very observant mind to take full advantage of the values producible by masking.

* Exchange positions of F_1 and F in the equation for diameter measurement numbers proportional to diameters.

As to the relative merits of masking versus re-etching, they are more naturally supplementary than competitive. It can be stated almost categorically that to the extent to which photographic manipulation can do the job at all, it can do it better than corresponding manual operations. For instance, masking can correct color unbalances of large areas while actually accentuating the finest detail in these areas. It can blend its corrective values with values being corrected, so smoothly that sharp lines of demarcation can be avoided, whereas there is a limit to the staging and re-etching which can be done without artificial boundaries becoming conspicuous; in fact, excessive re-etching, due to the multiple stagings usually required, almost invariably destroys that intangible thing called "photographic quality." But, of course, the one relatively enormous advantage which re-etching has over masking is that the etcher can make arbitrary corrections in localized areas, and can, after appraising the result of an initial proving, very skillfully make that delicate adjustment of values which is the difference between mediocrity and excellence.

New Materials Needed

However, masking, which is just nicely started, can advance more rapidly to a greater field of application than it has already attained if we have available certain new materials and equipment. Kodalith thin-base film is rendering excellent service as an intermediate mask due to its thinness, extreme contrast, and fair dimensional stability. Nevertheless, a color-blind continuous tone emulsion and a full-scale panchromatic emulsion on the same thin-base will greatly extend intermediate masking. The thin-base helps to avoid the formation of superficial lines due to parallax, on most subjects, but nevertheless there are occasional subjects with many sharply delineated areas where this parallax becomes a disturbing factor and sometimes forces the reduction or abandonment of masking.

A device which would eliminate this limitation would be a first-surface parabolic mirror sufficiently well-formed and coated so that a Zirconium pin-point arc placed at the focus would produce a beam of perfectly collamated illumination of sufficient cross-section to accommodate an 11 x 14 inch exposing area. This would make it possible to obtain critical register on same-size projections through one or more pre-registered sheets of film, or even through glass plate; the only limiting factor in making masking exposures being the extent to which halation might finally become objectionable. This would also render certain composite effects possible which cannot now be achieved because of parallax limitations.

The best correction for eliminating the errors in the green filter negative (that is, the magenta printer) is practically from the same red filter exposure required to make the blue separation negative. The yellow separ-

ation negative will usually be corrected best by a multiple exposure obtained partly from a red filter exposure and partly from a green filter exposure. The balance is determined by the actual inks used.

The greatest limitation on masking at present is the fact that there is no satisfactory way to get a photographic black plate deriving its values only from those areas of the subject having a true black component. There is no way optically to impart any distinctive quality to a neutral value that will not be possessed by other areas having no neutral component so far as the effects on a photographic plate are concerned. All that any filter or combination of filters can do is to modify or control the extent or location where some excess black value will appear.

This means that photographically the best possible black plate can only be produced by a careful study of the subject and application of all the controls that multiple exposures and masking technique can introduce. This in turn means that it is not possible to produce in advance a black plate with which to obtain the values for masking out under-color in the color plates. Any excess values in the black mask as now available, would mask out true color where it is needed as such in one or more of the color plates and thereby create serious complications.

If and when a theoretically correct black plate is available, which may be from sources now actively engaged in studying and developing the application of electronics to color correction, then it would be possible to make practically all of the corrections for true color balance directly in the camera by selective application of techniques previously mentioned. This would leave the resulting color corrected separation negative free to be masked separately for the accommodation of the black plate only. In such an event, the black mask could be made with any of the control factors already indicated, and developed or toned to a color whose transmission had a narrow band, preferably in the blue end of the spectrum. Then a series of calibrated filters would enable one mask to control the extent of the under-color masking for each positive of a set if the positives were made on panchromatic material. Practically normal unmasked effects would be produced through such a blue mask on color-blind material.

We tried out the general idea about five years ago using at that time only a blue-toned image for the colored mask. The idea was feasible. It was quite obvious, however, that the full exploitation of the idea depended upon the availability of the correct black to start with. In the meantime, a good developer for producing a spectrally pure dye-coupled blue might be offered the Graphic Arts, or possibly a well-graded series of filters especially adapted to the currently available magenta image would help, provided the spectrum of the latter is narrow enough.

What the Graphic Arts really need, however, is a true "black sensitive" plate which derives its values much as they are now derived on the black plate in the Eastman Fluorescent process wherein the gray values and the true colors are optically distinctive. To get such an effect, however, without the employment of special pigments and handmade copy, it seems that the following general brainstorm would have to materialize:

(1) There would be a multi-layer material whose three selectively sensitive layers would be quite similar in sensitivity to the current Ektachrome, Ektacolor, or Ansco Color.

(2) Instead of a color being formed by union of the reaction product of the developer and a bonded coupler, however, either the oxidation product of the developer or a product which could be catylyzed quantitatively in proportion to the amount of silver present in each layer, would produce each in its own later a separate component product; A in one layer, B in the second layer, and C in the third layer.

(3) A, B, and C would in turn be the necessary components of a compound which would be formed quantitatively in the amount determined by whichever of the three components, A, B, or C, was at a minimum.

Conceivably this objective, if it were at all attainable, could be made to produce a continuous tone image having the essentially correct values for a black. What a dream to hope for and what a nightmare to achieve! But there must have been a time when currently available color materials and techniques looked almost as hopeless.

XEROGRAPHY

*A New Principle of Photography and Graphic Reproduction**

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ABSTRACT

A new process of graphic reproduction and picture-making photography has been developed. The basic process, known as Xerography, is dry, direct positive, rapid and has a number of potential applications in graphic arts and related fields. As a photographic process, Xerography employs a re-usable plate consisting of a thin layer of a photoconductive material on an electrically conductive base. The plate is sensitized by electrostatic charging immediately before use. After exposure, the image is developed by dusting the plate with a micronized powder. Prints are made by transferring and fixing the powder image to paper or other materials. The plate can be used many times to produce additional images. Xerography also provides a unique and simplified process of graphic reproduction, particularly in printing and duplicating.

* Received from the Haloid Co., December 1, 1948. From a talk given before the October 1948 meeting of the Optical Society of America, Buffalo, N. Y., and published in Optical Society Journal, December 1948.

INTRODUCTION

The object of this paper is to introduce the subject Xerography and to present a general explanation of

the basic principles and techniques involved in the process.

Xerography was originated by Chester F. Carlson (1) in 1938, and first publicized by Nicholas Langer (2) in 1944. Since 1944, the process has been a subject of research and development in the Graphic Arts Research Laboratories of Battelle Memorial Institute, Columbus, Ohio, under projects sponsored initially by Battelle, and since January 1, 1947, by Battelle and The Haloid Company of Rochester, New York.

Xerography has a number of characteristics which distinguish it as being an entirely new process. The process is completely dry. No chemical reactions are involved. It is a direct positive-to-positive operation. The plates or films are not destroyed by exposure and may be re-used many times. The process is economical and versatile; prints may be prepared on almost any type of paper or any other material having a reasonably smooth surface. Finished, permanent prints may be completed in a matter of seconds.

PHOTOGRAPHIC ASPECTS OF XEROGRAPHY

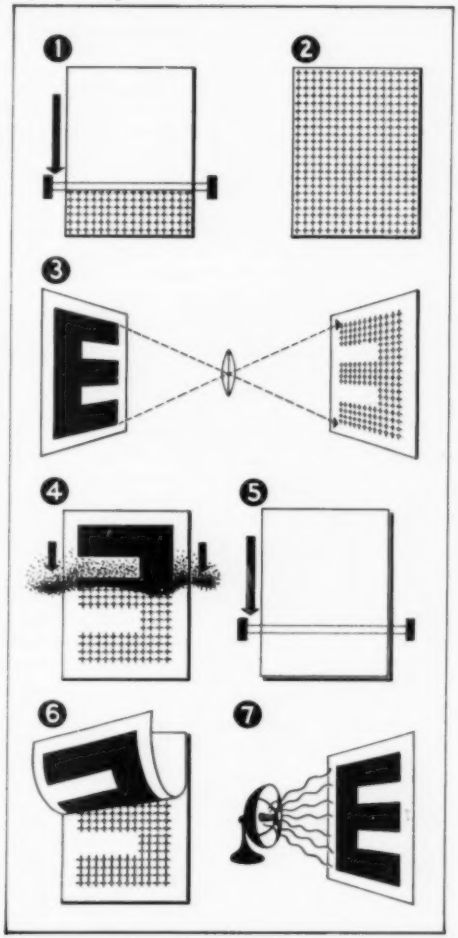
Description of the Process

The application of Xerography to photography involves the formation of an electrostatic latent image on a layer of photoconductive insulating material and the development of the image with a finely divided powder, which adheres to the electricity charged areas of the plate. The plate is sensitized by applying an electrostatic charge to the surface of the photoconductive coating. The sensitized plate is then exposed to the light image which it is desired to reproduce. Impingement of light on the photoconductive coating causes electrical charges to leak away or to be reduced in quantity in proportion to the amount of light falling on the particular area, thus leaving an electrostatic latent image. The image is developed by dusting the plate with a finely divided powder which adheres only to the electrically charged areas in proportion to the amount of charge remaining on the plate after exposure to light. Prints are made by transferring and fixing the powder image to paper.

The photosensitive plate consists of a photoconductive coating on a conductive supporting medium, such as metal. The developer consists of a finely divided powder, mixed with a coarser powder. The coarser powder serves to generate an electrostatic charge on the fine powder. The charged powder is then used to develop a latent electrostatic image on photoconductive coating.

The process involves photoconductivity and electrostatics. Photoconductivity has received considerable attention from both physicists and chemists. Images have been formed inside of crystals as discolorations directly associated with photoconductivity (3), and an image has been observed by Selenyi (4) on selenium-coated plates as a result of exposure to light. Also, pictures have been produced by electrolytic reaction on the surface of a photoelectrically sensitive layer (5). Various electrical and electrolytic photo-processes have been reviewed by Yates (6). Selenyi (7) (8), reported a process of forming an electrostatic image on insulating plates by various methods of scanning and of developing that image by dusting it with a finely divided powder. Various observations have been published concerning the generation of an electrical charge on powder particles from frictional or tribo effects (9), (10), (11). The reaction of the powder particles in electrical fields is well-known and is the basis of processes for the removal of dust particles from the air for electrostatic separation of powders (12) and for the deposition of powders in a pattern form (13).

Carlson (14) introduced the method of forming an electrostatic image on a photoconducting material and developing the latent electrostatic image with a finely divided powder.



HOW XEROGRAPHY WORKS

1. Surface of specially coated plate is being electrically charged as it passes under wires.
2. Shows coating of plate charged with positive electricity.
3. Copy (E) is projected through lens in camera. Plus marks show projected image with positive charges. Positive charges disappear in areas exposed to light as shown by white space.
4. A negatively charged powder adheres to positively charged image.
5. After powder treatment (Fig. 4) a sheet of paper is placed over plate and receives positive charge.
6. Positively charged paper attracts powder from plate forming direct positive image.
7. Print is heated for a few seconds to fuse powder and form permanent print.

Five steps are involved in making a photographic print by Xerography: (1) Sensitizing the plate with an electrostatic charge, (2) exposing the plate to form an electrostatic image, (3) developing the latent image with fine powder, (4) transferring the powder image to paper or other materials, and (5) fixing the image by fusing the powder. The plate can then be cleaned, after which it can be used again for additional photographs.

Preparation of the Plates

Xerographic plates for use in photography are prepared by depositing a smooth layer of a photoconductive material on a supporting medium. Sublimation is a suitable method for preparing such layers. The supporting medium is suspended in a bell jar, the air evacuated, and the photoconductive material evaporated by conventional methods. Photoconductive coatings of materials such as anthracene, sulphur, and selenium have been prepared by this technique.

Studies of the electrical properties of the photoconductive layers indicate that they must have specific dark resistances of approximately 10-15 ohm-centimeters to retain electrical charges on their surfaces. When the photoconductive materials are illuminated, this specific resistance must be reduced to something like 10-10 or 10-12 ohm-centimeters to account for observed exposure times. Photoconductivity is not an effect which lends itself to expression in terms of ohmic resistances so that the above values are to be used only in expressing qualitatively the characteristics involved.

Numerous materials have been used successfully as the supporting media for the photoconductive coatings. To serve as a conductive backing for the plates, it is only necessary for a material to have a specific electrical resistance below the equivalent resistance of the illuminated photoconductive layer. Thus, materials having specific resistances of approximately 10-10 ohm-centimeters can serve as backing materials. Such materials might ordinarily be considered to be electrical insulators. Plates functioned satisfactorily when the photoconductive material was deposited on various types of paper, glass and plastics having electrical resistances below that of the photoconductive material.

Sensitization of the Plates

Before the plate can be used, it must be sensitized by depositing an electrostatic charge on the photoconductive surface. Plates were originally sensitized by rubbing with materials such as fur and cloth. When a swab of fur is brushed across the surface of the plate, an electrostatic charge is generated on the surface. A more convenient method of sensitizing the plate, and one which gives higher plate potentials, is the application of a corona discharge from a row of needles or from fine wires. The plate is passed under the wires in the field of the corona discharge. Reversing the polarity of the voltage applied to the wires reverses the sign of the electrical charge on the plate. Electrical potentials from 4000 to 7000 volts are ordinarily used to produce the corona discharge with one to three 0.004-inch wires suspended approximately one centimeter above the photoconductive surface of the plate. Half-wave, rectified, unfiltered power sources are convenient, but electrostatic generators can be used.

The magnitude of the electrical charge on the plate resulting from the sensitization is measured by the potential to which the surface of the plate is raised. In the laboratory this potential is measured by an electrometer of the Lindemann type. The plate is brought to a definite position in relation to a probe connected to the electrometer, and the deflection of the electrometer is read and interpreted in terms of a calibration made with an electrically conducting plate in the same position. The maximum quantity of charge, which a plate will acquire during the sensitizing operation, is dependent on several variables. One of these variables is the time of charging of the plate under the corona discharge.

Because of the light-sensitivity characteristics of the plate, the sensitizing operation must be performed in the dark or under a suitable safe light. After one use, the plate can be resensitized and used over again. The primary limitation on the use-life of a plate appears to be the mechanical abrasion to which the plate might be subjected. If handled carefully, the plate may be reused many times. Some plates in the laboratory have been used over 500 times and still yield satisfactory reproductions.

Exposure of the Plates

The sensitized plate may be exposed by any of the conventional techniques. The plate may be mounted in a standard plate holder and exposed in a camera; images may be projected onto the plate by an enlarger; or the plate may be exposed by passing light through copy held in close contact with the plate. In the area where light strikes the plate, the photoconductive coating acts as a conductor for the electrostatic charge and disperses the charge into the supporting medium, leaving a latent electrostatic image on the plate surface. The light transmission of most papers is sufficient to permit the reproduction by contact exposure of such items as typed letters, drawings, ink or pencil memoranda, and printed matter.

A summary of what has happened to the plate during the sensitizing and exposing operations is as follows: The plate is sensitized to an initial potential. Laboratory measurements show that a slow decay of the charge takes place in the dark. The plate is then exposed to the light image. The potential of the areas of the plate exposed to light drops to a low value as the charge is conducted from the plate in those areas. The potential appears to decrease in proportion to the intensity of the light striking the photoconductive surface though the relationship is not exeactly an linear one. At a certain point the decay of potential ceases, leaving a minimum charge on the plate. Thus, the latent electrostatic image may have a potential which varies from near zero to a maximum over different parts of the plate. Indications are that tone gradation can be reproduced and that the process has fair photoregressive properties. The latent electrostatic image can be retained on the plate for several days without losing the image quality.

Image Development

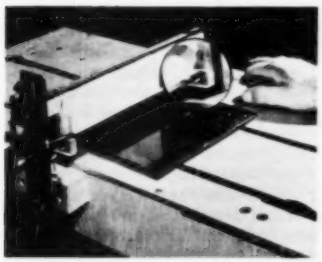
The developer, used to develop the latent electrostatic image on the plate, is a mixture of a micronized resinous powder and a relatively large particle size granular carrier. The micronized resin particles which are used to develop the image, are referred to as the powder, the larger granular particles as the carrier. The sizes of powder particles now used are from 0.1 to 20 microns for the powder and approximately 300 microns for the carrier. These sizes may be varied over wide ranges. In the developing operation, the granular particles of carrier serve to generate an electrostatic charge on the powder particles, thus causing the finer powder

particles to cling to the coarser carrier particles. Due to this mutual electrical attraction between the two powders, the carrier is able to sweep the finer developer powder across the plate surface. The electrification of the two materials is caused by triboelectricity. Formulation of the proper developer for use on a plate is determined by the relationship of various materials in the triboelectric series. An illustrative and abbreviated series is as follows:

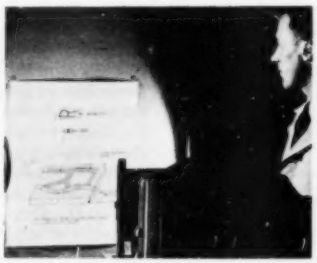
Corn meal———positive end of series
Cork
Calcium carbonate
Pigmented lycopodium
Rosin
Sand
Cupric sulphide
Tartaric acid———negative end of series

A triboelectric series consists of a list of materials arranged in such a way that each material will acquire a positive electrical charge when contacted or rubbed against any material below it in the list. In general, the magnitude of the electrical charge generated on each of two materials on contact will depend on the relative positions of the two materials in the series. If the materials are close together in the series, the magnitude of the charge will be small; if the materials are far apart in the series, the magnitude of the charge will be large. Thus, by combining the proper materials, one in the form of a micronized resin powder and the other in the form of a granular carrier, it is possible to control the magnitude and the sign of the electrostatic charge generated on the powder. Two developers suitable for reproducing high-contrast line copy are: (1) micronized tartaric acid powder and corn meal carrier, and (2) pigmented lycopodium and sand carrier. The former is for positively charged images, the latter for negatively charged images.

The image on the plate is developed by flowing the



This machine is the only specialized apparatus required for xerographic reproduction. It is used both to sensitize the plate and to transfer the powder image from the plate to paper. Called a "corona spray apparatus," it "sprays" electrons from the fine wire visible through the enlarging glass. When a plate is passing under the wire on the carrier belt, as in this picture, the electrons create an electrostatic surface charge. When a developed plate superimposed with a sheet of paper is passed under the wire, the image is transferred to the paper.

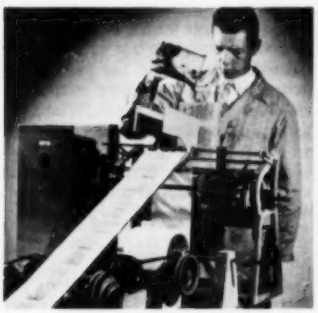


The xerographic plate may be exposed in a camera under an enlarger, or in a contact printing frame. Light striking the surface of the plate causes it to lose its electrostatic charge, leaving behind a pattern of electrons corresponding to the image pattern. In this photograph a technician is preparing to make a reproduction of a line drawing.

Following exposure, the plate is developed by flowing developing powder across its surface in a rocking tray. Oppositely charged particles of developer are released from larger carrier bodies and become attached to the image areas. A similar "triboelectric" technique is used to clean plates before sensitizing.

Xerographs may be made on any type of paper, on wood, glass, metals, or other materials. In the picture the technician is stripping the transferred print from the plate. Heating the print will fuse the powder to the paper and make the image permanent.

In this photograph the technician is preparing a zinc offset duplicator plate by xerography. A powder image on a sheet of paper has been transferred to the zinc plate electrostatically and the paper is being stripped from it. The residual image on the paper represents an excess of developing powder and will not lessen the intensity of the printing surface. The next step will be to fuse the powder image to the plate, after which it will be ready for use.



Dry printing is one of the potential uses of the process. With this experimental machine, Battelle engineers have already achieved a press speed of 1200 web-feet per minute. Chief advantages of xeroprinting will be the light weight of printing machinery and simplicity of plate-making. Since the image is transferred from plate to paper electrostatically, no pressures are required. The use of "dry powder" also eliminates drying and offset problems.

powder over the surface of the plate. In the laboratory, the plate bearing the latent image is placed in a tray and developer cascaded back and forth over the surface of the plate by tilting the tray.

Resolving Power

Present plates and powders have a resolving power of between 7.5 and 10 lines per millimeter. Because the latent image on the plate is of an electrostatic nature, it is believed that the resolving power of the process will be limited only by the size of the powder particles used to develop the image.

Photoregression

Experiments to determine the photoregression on various photoconductive surfaces have indicated that some photoconductors will retain the latent electrostatic image before developing for a period of 100 hours without appreciable loss of contrast in the image and for 240 hours without loss of resolution.

Spectral Sensitivity and Photographic Speed

The spectral sensitivity of the plates, using selenium as the photoconductor, is approximately equivalent to orthochromatic film. The speed of such a coating is about 0.3 ASA (Tungsten).

Multiple-Copy Reproduction by Xerography

The cycle of operations for obtaining a photographic print by Xerography can be repeated over and over again to obtain as many copies of a particular design or subject as might be desired. Since the process is positive-to-positive, any printed sheet drawing in which the printing or writing is on one side of the paper, could be used as a positive for contact exposure with a Xerographic plate. If the subject matter to be reproduced is printed on both sides, such as literature or pages from books, the subject can be photographed by the Xerographic procedure, using a camera. However, after the first copy has been prepared additional copies can be produced by contact methods.

Where a large number of copies of the same subject material are desired, the developed powder image can be fixed onto the plate, either by spraying with a solvent or by fusing the resinous powder with heat. Multiple copies can then be made by simply subjecting the plate under light to the electrostatic discharge which places a charge on the fused image, dusting with powder and then transferring to paper. This cycle can be repeated indefinitely for as many copies as might be required since the plate with the fixed image can be used as the master plate. When the plate is to be used again for another subject or design, the resin image can be washed off with a solvent. Thus, in this process of making multiple copies the exposure step is eliminated except in the initial preparation of the master plate.

Another application of Xerography to multiple-copy production involves the use of a plate which consists of an insulating image layer on a conductive surface. Such a plate can be prepared by a number of different methods. For instance, the design or image can be drawn or painted on the surface of a metal sheet with an insulating lacquer. However, a more practical way of producing an insulating image on such a plate is to use the established photomechanical methods used in preparing lithographic printing plates and photoengravings, in which a bichromated colloid is used as a sensitive coating on the plate. After exposure in contact with negative or positive of the subject, the plate is treated by washing or developing to provide a sharp resist image on a metal surface. Such a plate might be termed a dry planographic printing plate. The steps of obtaining printed copies of such a plate are simply to charge the image, dust with powder, and transfer to paper. This is the basis of a new method of printing. The method is unique inasmuch as it does not require pressure or liquid inks. The ink is replaced by dry powder and instead of mechanical pressure the impression is obtained by electrical transfer. This technique has been incorporated into a laboratory printing machine in which the printing plate is mounted on a rotating cylinder. The dusting and transfer operations are accomplished at convenient intervals around the cylinder. With this equipment, it has been possible to print at speeds of more than 600 linear feet per minute, the paper being fed to the cylinder from a roll.

CONCLUSIONS

Xerography constitutes a new and different approach to the recording of light images and the printing of multiple copies of original designs. The process has proven to be applicable to photo-copying—having the distinct advantages of rapid and dry processing. Continuous-tone subjects, and even live subjects, have been Xerophotographed with fair results. Color prints have been made from transparencies by using filters and complementary colors in developing powders. The process shows promise of being applicable to the general field of color reproduction. Since images can be transferred to numerous materials, the process should have application in the field for surface decoration.

Potential applications to the fields of duplicating and printing are indicated, and applications to the photographic and photomechanical (15) branches of the graphic arts industry are possibilities.

ACKNOWLEDGMENTS

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REFERENCES

(1) U. S. Patents No. 2,297,691 and No. 2,357,809.

(2) Nicholas Langer, "Electrophotography," *Radio News, Eng. Dept., 32,* 22 1944.

(3) A. L. Hughes, "Photoconductivity in Crystals," *Review of Modern Physics, 8* 312 (1936).

(4) P. Selenyi, "Photography on Selenium," *Nature, 161* 522 (April 3, 1948).

(5) Goldman, German Patent No. 674999.

(6) R. F. Yates, "Photo-Electrography—Tomorrow's Miracle," *Radio-Craft,* p. 334, March (1943).

(7) P. Selenyi, "On the Electrographic Recording of Fase Electrical Phenomena," *Journal of Applied Physics, 9,* 637, (1938).

(8) P. Selenyi, "Methoden, Ergebnisse und Aussichten des elektrostatischen Aufzeichungverfahrens (Elektrographie)" *zeits. f. tech. Physik,* 16, 607 (1935)

(9) Leonard B. Loeb, "The Basic Mechanisms of Static Electrification," *Science 102,* 573 (December 7, 1945).

(10) H. F. Richards, "The Contact Electricity of Solid Dielectrics," *Physical Review, 22,* 122, (1923).

(11) F. E. Shaw, "Experiments in Tribo-Electricity," *Proceedings of the Royal Society, A, 94,* 16 (1917).
(12) F. Frass and O. C. Ralston, "Electrostatic Separation of Solids," *Industrial and Engineering Chemistry, 32,* 600 (1940).
(13) U. S. Patents Nos. 2,097,233 and 2,152,077.
(14) U. S. Patents No. 2,297,691 and No. 2,357,809.
(15) R. M. Schaffert, "Plate Making Without Film," *Share Your Knowledge Review* (Technical Digest), P. 33, Vol. XXIX, February, 1948.

THE TESTING *of Photographic Shutters*

S. H. DUFFIELD* AND L. R. LANKES*

Summary:
This report comprises a comprehensive review of published material, including U. S. Patent literature. It reveals a rather limited application of fundamentals. The distinct phases in the evolution of shutter testing are: the development of mechanical systems, the development of electromechanical followed by "all-electronic" analogues, and finally the invention of systems for testing the focal-plane shutter which poses a special problem.

The use of photography as a medium for producing a permanent record imposes the demand of versatility sufficient to cope with subjects having extreme ranges in brightness, size and conditions of motion. While a photographic shutter acts merely as a valve, and does not contribute directly to the quality of the recorded image, it may, because of malfunction, result in failure of the process.

From the time when photographic emulsions had sufficient speed to make exposures of a fraction of a second practical, there has been a sustained interest in the whole subject of shutter speeds and efficiency, with much thought given to means of evaluating these functions. As early as 1882, G. F. Addenbrooke gave a paper before the Royal Photographic Society on this subject in which he states, "As far as I am aware, the shutter testing methods used up to the present have been as follows:

* Eastman Kodak Company. Development Department.

"To photograph a falling weight . . . .
"To photograph a pendulum . . . . . .
"To photograph a hand moving around a dial at a constant rate . . . . ."

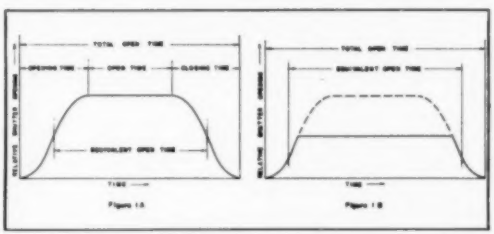
In general mechanical shutter checkers all depend on the known relative motion between two of the three main components of the system, viz., the object, the shutter, and the recording medium. In practice it is usual to move the object or the recording medium rather than the shutter, but it may be more convenient to pulse the light at a known frequency than it is to control accurately the relative motion within the system. This is satisfactory since the frequency of the flashes forms the time-base for measurement purposes.

We may, therefore, divide mechanical checkers into three groups based on the following considerations:

(a) The object moves at a known rate.
(b) The recording medium moves at a known rate.
(c) Light is pulsed at a known rate with coincident movement of either the object or the recording medium.

The three methods mentioned by Addenbrooke are all of the first type. British Patents were issued to Wilson in 1886 for such a system in which a slit revolved in front of an illuminated background, and to Wynne in 1903 for a pendulum system. In 1895 Boyd and French, at Ohio State University, described a modulated light system in which the modulation was achieved by reflecting a beam of light from the polished surface of one prong of a tuning fork. In 1909 Campbell and Smith (1) used a vibrating string galvanometer as the modulator. In another system Abney used as the modulator a slotted disc revolving in front of a fixed slit with film on a rotating disc as the recording medium. This seems to be the first reference to the use of film as a substitute for photographic plates.

Up to this point the various methods described had shown chiefly total-open-time (Figure 1A). By total-open-time is meant time elapsed between initial opening and final closing movements of the shutter blades. These methods were useful in evaluating a shutter as a means of stopping motion. They did, however, lack the ability to give a true measurement of shutter efficiency, i. e., the amount of light a shutter actually passes with reference to the amount it could pass during the same total-open-time if the opening and closing took place truly instantaneously.



Today it is more common to speak of the average-time or equivalent-open-time, defined as the interval in which total light energy (flux x time) would pass if the shutter remained fixed at full opening, which correlates with actual photographic exposure. Figure 1A shows a typical curve for the operation of a between-the-lens shutter. The effect of a small diaphragm opening with the same shutter speed is suggested by Figure 1B. Effective exposure thus is not proportional to diaphragm opening alone, but depends also on shutter efficiency. Where the efficiency is high (usually at relatively low speeds), the discrepancy between total-open-time and equivalent-open-time is small, but as the efficiency falls off (at relatively high speeds), it may amount to nearly 100 percent. Because of this effect, later efforts were directed toward the evaluation of shutter efficiency and equivalent-open-time.

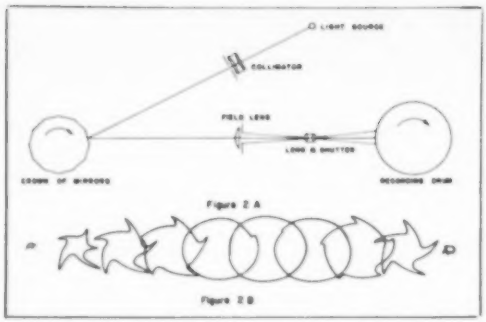


Figure 2 A

Figure 2 B

In 1916, Nutting (2) described a machine, Figure 2A, for doing this. As can be seen, the rotating crown of mirrors provides a modulated light source for illuminating the shutter. The recording drum is driven at a rate sufficient to separate the images to give a record such as is shown in Figure 2B. By measuring the area of the separate images with a planimeter, it is possible to obtain an accurate record of the complete shutter cycle and, from it, to calculate the equivalent-open-time.

It is possible today to construct a mechanical shutter checker with nearly any desired characteristic, using either a constant-speed synchronous motor or an accurately controlled, variable-speed motor.

Figure 3 shows a mechanism similar to that patented by Kershaw (3) in 1906 for providing a visible record of the speed of a shutter. In operation the shutter is tripped repeatedly and the speed varied (as suggested at A and B) until a trace is given as at C, at which time the speed is read directly from the calibrated controller. The number of slits in the disc depends on the speed of the motor used and the range to be covered. If desired, several rings of slits with set ratios such as 1-2-4-8-16 may be used with a motor speed range of only 1 to 2. A double ring of slits and a motor speed ratio of 2 to 3, with a fixed point calibration, may be used to check the usual tolerance of plus minus 20 percent. Possible combinations of slits and motor speeds may be found by simple calculation to fit nearly any set of conditions.

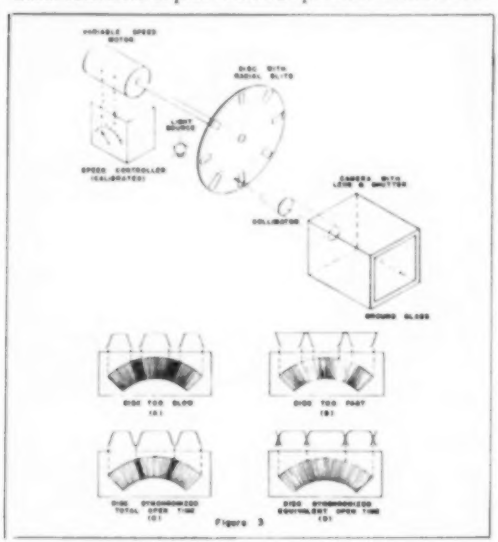


Figure 3

The means is there also for measuring equivalent open-time by adjusting the speed until the appearance of a uniform band as in Figure 3D. Since the intensity of the slit image varies in accordance with the characteristic curve of the shutter, as suggested in Figure 3A, B, C, and D, appraisal requires some experience although, once trained, an operator can obtain results having sufficient accuracy.

A variation of this idea employs a crown of mirrors in place of the disc with radial slits. Auxiliary mirrors are arranged so that three faces of the crown may be viewed simultaneously. In operation it is similar to the instrument just described, but it lacks the same versatility since it is impractical to add other mirrors with different numbers of faces.

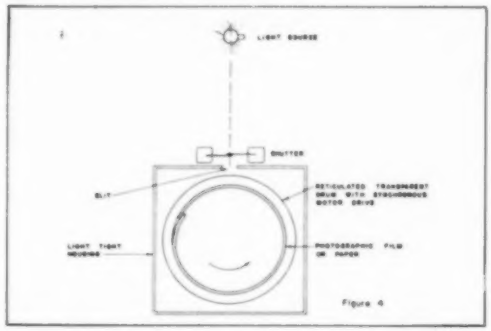


Figure 4

The American Standards Association (4) proposed for checking focal-plane shutters, an instrument which can also be used for between-the-lens shutters. This was an adaption of a device developed by Mark Hurd Mfg. Co. just prior to World War II. A sketch of the mechanism is shown in Figure 4. In operation, the shutter without lenses is placed as closely as possible to the slit in the housing. The motor is started and the shutter is tripped. The result is a trace of the shutter blades or the curtain such as shown in Figure 5A or 5B.

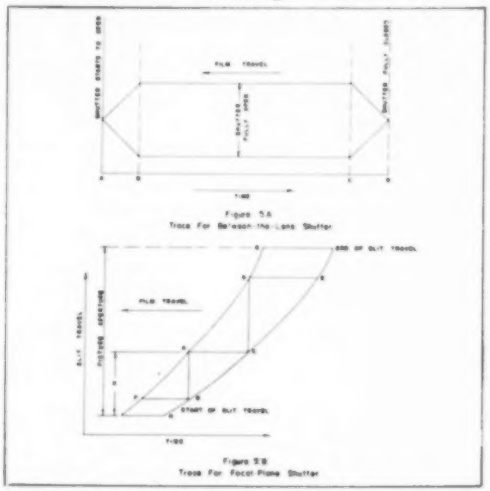


Figure 5A
Trace For Between-the-Lens Shutter

Figure 5B
Trace For Focal-Plane Shutter

In the case of a between-the-lens shutter, Figure 5A, the equivalent-open-time is represented with sufficient accuracy by AD plus BC over 2. Although the shutter, in its early and late phases of operation, is a horned figure and not an expanding and contracting circle, there is no appreciable error. This is borne out by comparing the results with those obtained by electronic methods which integrate the light.

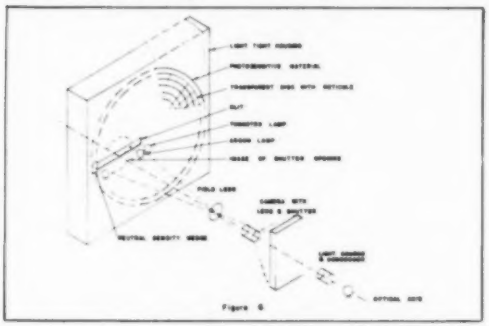
In measuring the effective exposure time of a focal-plane shutter, Figure 5B, at some distance X from the edge of the picture aperture, the slit width will be AB as it enters this point, and CD upon leaving. The arithmetic mean is taken as the equivalent slit width at this point. To determine the linear velocity of the slit at this point, it is necessary to average the velocities at points A, B, C, and D. The following equations then apply:

Vs equals Vf (tan GDE plus tan DAC plus tan ACB plus tan FBH) divided by 4 where Vs equals velocity of slit and Vf equals velocity of film.

Then Effective Exposure time, te equals w divided by Vs where w equals width of shutter slit.

Efficiency, N equals w divided by w plus ds over f where ds equals distance of shutter slit from focal plane and f equals f or number of lens.

and, finally, Total-Open-Time, to equals te over N.



A mechanism embodying a similar principle is shown in Figure 6, and follows closely the broad idea published by E. A. Salt (5) in 1909. In this system the shutter opening is imaged on a rotating photo-sensitive disc by a filed lens. A radial slit immediately in front of the disc limits the image to a narrow beam of light which is essentially a diameter of the camera lens. The transparent disc with reticule is driven by a synchronous motor and carries a disc of bromide paper. The radial lines of the reticule are spaced to represent 1-millisecond intervals and the concentric lines are for reference purposes. A small tungsten lamp, shielded to illuminate a limited area, serves to print a time scale. An argon lamp, similarly shielded, indexes the point at which an accompanying flashbulb circuit (Figure 7) is closed. At the outer edge of the disc a portion of the slit is covered by a small neutral-density wedge upon which light falls from a shielded flashbulb. A disc of photographic paper is placed in the carrier; the shutter is cocked; the synchronizer is set; and the motor is started. A flashbulb is set in place if desired. The small tungsten lamp is energized during at least one revolution of the disc to print the time scale after which the main light source is energized and the shutter is tripped. The argon lamp is flashed, the flashbulb (if used) is fired, and the shutter operates to record a trace like that in Figure 8A. The equivalent open-time equals AD plus BC divided by 2; the synchronizer contacts close (at E), X milliseconds before the shutter is fully open (at B); and the flashbulb reaches peak intensity (at F), Y milliesconds later. The apparatus may be used for testing focal-plane shutters if the camera is placed so that the slit will travel radially with respect to the recording disc. A trace is shown in Figure 8B. In instances when the system transmits sufficient light, the photographic material may be replaced by a suitable phosphor to permit immediate visual appraisal.

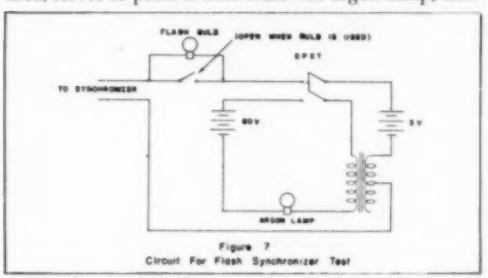
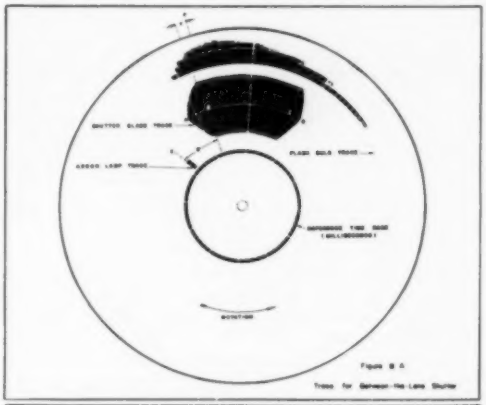
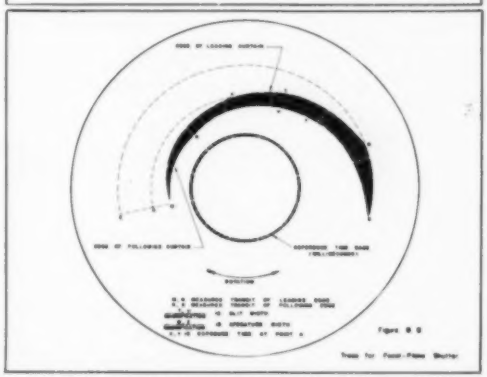


Figure 7
Circuit For Flash Synchronizer Test





In 1943, T. Temple (6) patented a device for testing focal-plane shutters. It consists of a bank of elongated gas discharge tubes operated through a rotary commutator so that they flash in sequence at a known rate. The camera to be tested is placed so that the bank of tubes is focused on the image plane with the direction of

Charles B. Phelps, Jr., FPSA

Just as we were about to go to press, word was received of the death of Charles B. Phelps, Jr., FPSA, President of the Photographic Society of America, in Grosse Point, Michigan on Wednesday, January 19, 1949. Funeral services were held on January 21st. An obituary will be published in the February PSA JOURNAL.

shutter travel parallel to the tubes. This results in a trace such as that shown in Figure 9, where A is the slit width, and B the distance an edge of the curtain travels during the flash interval (t). The exposure is At over B assuming that the slit velocity and slit width remain constant for this short interval.

The majority of devices for checking flash synchronized shutters simulate the ignition of the flashbulb by mechanical, or magnetic, time-delay systems. Most of these only approximate the action of the flashbulb, since the time for the flash to reach peak brilliance is not constant but varies with the type and make of the bulb, the power source, efficiency of the contacts, etc. It is more significant to measure the time at which the contacts close with reference to the operation of the shutter. U. S. Patents of Smith (7), Mendelsohn et al (8), Sprague (9), and others provide considerable information on this type of equipment.

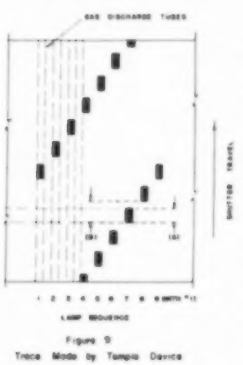


Figure 9
Trace Made by Tempo Device

In 1940, Kearsley (10) described a synchro-shutter testing system in which a modulated light beam, after passing through the shutter, is electronically detected and amplified. The signal is made to produce a spark trace on a rotating disc. The circuit is arranged so that there is a single spark at the instant the synchronizer contacts close. The relation between this single trace and the spark race for the shutter is a function of the adjustment of the synchronizer.

The low inertia inherent in electronic systems presents a number of possibilities. It permits the use of equipment which can be accurate to nearly any degree desired and, at the same time, is easily adapted to study all types of shutters, flash bulbs, and synchronizers. It would seem that the ultimate is reached in the development of systems employing cathode ray tube equipment. These present the outstanding advantage of yielding a record in graphic form (e. g. relative shutter opening vs. time) on a continuous basis as opposed to the discontinuous basis of earlier systems wherein some treatment of the data was necessary to derive the characteristic curve. The evolution of electronic methods has been made the subject of a separate paper (11).

The authors are indebted to many associates whose interest and cooperation aided substantially in developing the ideas herein presented.

BIBLIOGRAPHY

1. Campbell & Smith *Philosophical Magazine* 18, 782, 1909.
2. P. G. Nutting *The Photographic Journal* 56, 172, 1916.
3. Kershaw U. S. Pat. No. 808, 384 1906.
4. American Standards Association War Standard Z52.65 1946. Z52.63 1946.
5. E. A. Salt *The Photographic Journal* 49, 170, 1909.
6. Temple U. S. Pat. No. 2, 314, 254 1943
7. Smith U. S. Pat. No. 2, 145, 321.
8. Mendelsohn et al. U. S. Pat. No. 2, 332, 587.
9. J. A. Sprague U. S. Pat. No. 2, 353, 896 1942.
10. W. K. Kearsley U. S. Pat. No. 2, 296, 676 1940.
11. S. H. Duffield and L. R. Lankes "The Testing of Photographic Shutters—Electronic Systems" *Electronics* July 1948.

ELECTRONIC BIBLIOGRAPHY

A. B. Fuller Electronic Chronometer U. S. Pat. No. 1, 954, 313 1934.
J. D. Kelley Camera Shutter Tester U. S. Pat. No. 2, 168, 994 1937.
C. J. Penther Timing Device and Method U. S. Pat. No. 2, 274, 158 1942.
W. E. Merriman et al. Photographic Shutter Tester U. S. Pat. No. 2, 376, 162 1945
Reich and Marvin *Review of Sci. Inst.* Dec. 1931.
J. A. M. V. Liempt and J. E. deVriemd "A New Method for Examining Photographic Shutter Speeds" *Zeitschrift fur Physik Vol. 98*, 1935.
J. D. Kelley "An Instrument to Study the Intensity of Transient Light Pulses" *Journal of Optical Society* January 1938, p. 27, Vol. 28 (No. 1).
W. C. Williams and J. P. Wolfenden *Wireless Engineer* 14 315-317 1937.
O. S. Puckle *Time Bases* (Scanning Generators) John Wiley & Sons, Inc., Chapman and Hall Ltd. 1943.
W. Wilson *The Cathode-Ray Oscillograph in Industry* Chapman and Hall, Ltd. 1945.
H. M. Ross Non-linear Time Bases for Testing Shutters and CRO Equipment Prov. Application No. 28801 - 46 Sept. 1946.
R. F. Redemske "Electronic Shutter-testers" *Electronics* Feb. 1946, p. 128, Vol. 19.

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